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Electrical World

NEWS ISSUE

December 29, 1945

EDISON MEDALIST for 1945 is Philip Sporn, executive vice-president of the American Gas & Electric Service Corp. The award was made "for his contributions to the art of economical and dependable power generation and transmission"

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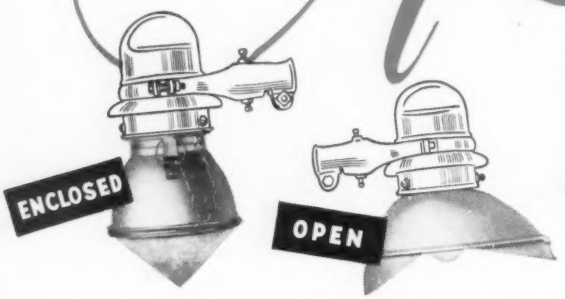

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Electrical World

NEWS ISSUE

Volume 124, Number 26 December 29, 1945

United States Advocates Control of German Power

Will Urge on Allied Control Council 5-Point Program of Power Control Which Would End Forever Germany's Ability to Wage War—60 Percent of Generating Capacity Would Be Removed, Leaving 9,000,000 Kw.

As part of its plan to disarm Germany economically and industrially, the United States will urge on the Allied Control Council in Berlin a five-point program which would

1. Remove 60 percent of Germany's power generating capacity.
2. Limit any export of energy from Germany to a "temporary emergency period" not to exceed 12 months.
3. Establish an administrative control of the German power industry designed to prevent expansion of that nation's generating and transmission capacity "above that amount clearly needed for peaceful pursuits."
4. Establish a German Utilities Director with power to effectuate the foregoing controls.
5. Include in the peace treaty ultimately to be negotiated with Germany a clause forbidding expansion of the German power industry beyond a level required by a peacetime German economy, such level to be reviewed periodically by "the appropriate international enforcement agency."

The power program is one of 32 similar programs which were disclosed last week by Henry H. Fowler, Chief of the Enemy Branch of the disbanded Foreign Economic Administration. Prepared by a committee headed by Edward Falck, at that time director of the Office of War Utilities, the program was adopted without change by Fowler in preparing his overall report on German economic and industrial disarmament. The power plan was completed last May, and is known to differ rather radically from the power program which was drawn up by the British at the same time.

Under the most spectacular of the Falck Committee recommendations, 13,000,000 kw. of German generating capacity—and associated transmission facilities—would be removed as rapidly as possible from Germany, leaving that nation 9,000,000 kw. The report noted the impossibility of determining precisely how much power capacity should be left without a precise determination of how much industry was to be left.

Repeatedly, the subcommittee emphasized that strict control over electric power would prove an excellent means of controlling Germany's war-making potential provided it were exercised in conjunction with other controls. It was further emphasized that without such other controls, and enforcement of all controls, power controls would be of little effectiveness.

The U. S. program, of which the power program is only a small part, must be fitted into British, French, and Russian plans for the same end and all created into one mutually-acceptable overall program by February 2, under the Potsdam Agreement.

In his overall report, Fowler emphasized that the primary and all-controlling interest of the United States in German industrial and economic disarmament is to destroy Germany's war-making potential. Fowler noted that in 1944, Germany's industrial war-making capacity was greater than it had been in 1939.

Examples of what the Fowler report would do to other industries follow:

1. Automotive industry capacity reduced from 272,000 cars and 62,000 trucks yearly pre-war to 90,000 units of 2,500 lbs. maximum weight yearly.
2. Steel ingot and casting capacity reduced from 22,000,000 tons to 5,000,000 tons.
3. Aluminum capacity would be left to fabricate 40,000 to 50,000 tons of ingot annually.
4. Synthetic oil—none.
5. Crude oil—equipment would be left to process 700,000 tons of petroleum annually.
6. Rubber—no capacity to manufacture synthetic rubber would be allowed. Equipment to process 30,000 tons of imported rubber annually would be left.

Recommend Import of Power

In its power recommendations, the Falck subcommittee suggested that:

1. Where Germany can feasibly import more power, it should be required to do so by the removal of additional facilities.
2. Equipment removed should be made available for reparations or junked. Buildings and foundations from which power capacity is removed should be destroyed completely.
3. Wherever possible, steam plants burning hard coal should be removed in preference to steam plants burning brown coal, or lignite. This runs contrary to the recommendations the British were preparing last May. The British were believed to want hard coal burning plants kept to prevent the freeing of hard coal which would compete with traditional British markets in Northwest Europe. Freeing of extra coal for ex-

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port from Germany and the absence of brown coal outside Germany were the reasons advanced in the U. S. plan for its recommendation.

It was estimated that it would require the labor of 10,000 men for three years to complete the recommended power removal program.

The Falck Committee noted that its studies were confined to the production, transmission, and distribution of electric power in Germany, and pointed out that the value of its program could be mitigated if strict control were not kept on other forms of power which could be used to free electric energy for electrochemical and electro-metallurgical industries.

Emphasizing its warning that Germany, which remained a net importer of power throughout the war, must not be allowed to become an exporter for a period longer than that of grave emergency, the Falck Committee pointed out that to allow Germany to do so would be to strengthen rather than weaken its economic dominance over its neighbors. Moreover, capacity used to provide energy for export could rapidly be shifted back to domestic consumption. This in turn would mitigate the effect of other phases of the industrial disarmament program. The necessity for keeping an electrical manufacturing industry in Germany would be increased by the retention of power capacity for energy export purposes, the report held.

Electric Manufacturers Hit

While it did not prepare a program for disarmament of Germany's electrical manufacturing industry, the Falck Committee by inference recommended that such industry in Germany be dealt with severely, noting:

"As United States war production experience shows, manufacturers of heavy electrical equipment are among the most versatile and most valuable manufacturers of munitions. Any measure which would restrict the future activities of the heavy electrical equipment manufacturers in Germany would greatly contribute to her industrial disarmament."

The committee estimated that German post-war consumption of electric energy could properly total 28.5 billion kw.-hr., of which about 20 billion would be for industrial purposes. In 1944, it was estimated that Germany used 65 billion kw.-hr. for industrial purposes, and about 23 billion in 1934.

It was suggested that where a choice lay between removing a given amount of capacity in the form of numerous units or in a few units, the larger number of units be removed. It also recommended that broad steps be taken to assure that stocks of maintenance materials do not slip into uses where they would add to German power capacity.

The committee unanimously rejected the proposition that all German generating capacity be removed and only energy transmitted into the country be allowed. It was agreed that such a program would be "of such proportions as to be impractical." The job would require "construction of generating and transmission facilities comparable to those now existing in the United Kingdom," the report noted. The idea had been found to have "sufficient possibilities to merit favorable consideration" by Drs. Harold G. Moulton and Louis Marlio of the Brookings Institution. Marlio authored a Brookings Institution report in defense-program days which contained estimates that U. S. power requirements in 1945 would be 326,000,000,000 kw.-hrs.

The Falck Committee recommended that whatever power plan finally is adopted should be applied uniformly throughout Germany.

FPC HEADS—Nelson Lee Smith, vice-chairman of the Federal Power Commission, left, and Leland Olds, chairman, after their election last week

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ASA Re-Elects Bryans Head; Other Officers Named

Henry B. Bryans, executive vice-president and director of the Philadelphia Electric Co., has been unanimously re-elected to serve a third term as president of the American Standards Association.

Frederick R. Lack, vice-president and manager, radio division, Western Electric Co., Inc., was elected vice-president. Other officers of the American Standards Association announced at the annual meeting, held last week in New York, are E. C. Crittenden, assistant director of the National Bureau of Standards, as chairman of the Standards Council, and L. F. Adams, General Electric Co., as vice-chairman of the Standards Council.

Arkansas Co-ops May Lose Favored Status

P. S. C. Sets Hearings for Feb. 5 to Determine If Co-ops Are on Same Basis as Private Utilities

Arkansas Public Service Commission has issued an order requiring the REA-financed rural cooperatives in the state to appear on February 5 and show cause why they should not operate on the same basis as business-managed electric companies in the granting of certificates of convenience and necessity and line extension authorizations.

Co-ops in Arkansas have been operating under rules and regulations of the Commission issued April 22, 1937.

"When these rules were written, the co-ops were in a formative rather than an operative stage," the order sets out. "The Commission feels that in view of this fact and because of our own desire to see that rural Arkansas receives electric service, the co-ops and the private utility firms should be placed on the same basis in certain respects."

Chairman Charles C. Wine of the Public Service Commission pointed out that under present regulations the Commission is unable to determine exactly what lines have been built in territory allocated to co-ops because they are not required to file reports on progress of construction, while private companies are.

Should the 1937 rules be revised, it is the intention of the Commission to require co-ops to furnish regular progress reports. It is hoped that it will be possible for the Public Service Commission to be able to investigate and correct complaints from rural customers of co-ops. The new rules would require co-ops to file with an application for new lines a table showing the number of assured domestic, commercial and industrial power customers to be served and the estimated annual revenue as well as an estimated cost of the contemplated construction.

The Commission also proposes to revise its rules defining economic feasibility of a project. By such a change the co-ops would have to show that any project eventually could be paid out, which, in turn, would result in lower rates to customers. Testimony at hearings recently before the Commission on territory allocation petitions has shown that at least one Arkansas co-op is losing money.

It is the intention of the Commission to see that the co-ops are required, as are the business-managed companies, to develop fully any area alloted to it in the basis of two customers and prospect per mile, Chairman Wine said.

Deficiency Appropriation Bill Differences Settled

House and Senate in Conference Committee Follow Traditional Way of Splitting the Difference—Public Power Projects Gain—Bureau of Reclamation Gets Additional Allotments for Transmission Lines

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The House and Senate went home for Christmas last week after compromising their differences on the first Deficiency Appropriation bill in the traditional way—splitting the difference.

As a result of the yuletide spirit of give and take which permeated the Conference Committee, the Interior Department's Reclamation Bureau emerged with a distinctly broader authorization, in point of funds and transmission lines, than the House originally planned to give it.

The Committee cut a $600,000 boost by the Senate in funds for bureau administrative expenses to $500,000. The item for investigations, which the House was willing to allow $500,000 and for which the Senate advanced $1,500,000, wound up at $1,000,000. Thus, the total expendable from the reclamation fund for these and other projects was set at $21,242,000. The $1,800,000 difference between the two Houses on the Davis Dam item was compromised at $900,000, leaving the item at $5,900,000, with the $900,000 assigned to the construction of a second 115-kv. transmission line between Phoenix and Tucson, Ariz., a project the House had rejected completely.

The House struck from the bill completely a $197,000 item for plans for the Kings River project. The $1,500,000 difference between Houses on the Colorado-Big Thompson item was split down the middle, leaving the total $5,750,000, of which $500,000 is for the Brush-Sterling-Holyoke, Colo., 115- and 66-kv. transmission line, another item the House had rejected completely.

The Columbia Basin project wound up with a $10,275,000 appropriation which again represented a halving of the $450,000 difference between the two Houses, and the revised total for general fund construction was set at $44,640,000.

The Senate had its way on the Colorado River development fund item which stayed at $1,000,000, as approved by the Senate. The Fort Peck item was compromised to stand at $800,000, about halfway between the House and Senate figures. Most of the money eliminated by the House and restored by the Senate was for transmission lines and substations.

The Missouri River Basin item was agreed on at $10,780,300, representing somewhat more of a concession by the Senate than by the House.

The proposed $2,000,000 Garrison Dam project on the upper Missouri River was stricken from the bill by mutual consent after both houses had been unable to agree on the height of the dam. The House held out for a maximum of 1,830 ft. while the Senate refused to take anything less than 1,850 ft., the height suggested by the Army Engineers. Unable to resolve the conflict, both Houses finally agreed that none of the $2,000,000 appropriated for the dam could be used for actual construction. The money can be used only for preliminary work.

There was nothing before the conference on the Securities and Exchange Commission item, but the Federal Power Commission difference was split down the middle, with FPC getting $50,000 of a $100,000 increase the Senate had allowed for administrative expenses, and $25,000 of a Senate-approved $50,000 item for flood control surveys. The Commission thus received $250,000 for administrative expenses and $25,000 for flood control. Originally, the House had allowed nothing for flood control.

On the $84,659,000 item approved for the War Department's flood control program, the House receded completely.

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Atomic Reconversion Bill Introduced by Rep. Sabath

Problems connected with atomic energy, which for some weeks had been more or less shelved by Congress in its Christmas recess rush, reappeared briefly on Capitol Hill late last week.

Rep. Adolph Sabath, Illinois Democrat, introduced a bill authorizing President Truman to spend $2,000,000,000—equal to the entire cost of the Manhattan district—to "reconvert" the nation's atomic bomb plants to peacetime uses. Under it, scientists would be mobilized to apply atomic energy to "transportation, communications, heating, lighting, and all other domestic functions."

At the other end of the capitol, a Senate committee heard a Stone & Webster engineer assert that no foreign country could build plants similar to those the United States needed to manufacture atomic bombs without U. S. technical assistance.

Frank R. Creedon, Stone & Webster's resident manager during the construction at Oak Ridge, Tenn., made the assertion in reply to questions by Sen. Eugene Millikin, Colorado Republican.

Any country attempting to build a plant such as that at Oak Ridge, even Great Britain, would need the help of

MONEY FOR THOSE WHO RETIRE—James H. Polhemus, left, president of Portland General Electric Co., makes the first payment of $560,000 on the company's new retirement plan to a representative of the Equitable Life Assurance Society. The plan will provide pensions up to $200 a month for employees at age of 65

such firms as Westinghouse Electric Corp., General Electric Co., and Allis-Chalmers Manufacturing Co., Creedon declared, adding that it would take four years to build such a plant in this country in peace-time and seven or eight years abroad.

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500-Kv. Transmission Line Will Be Tested

American Gas & Electric and 9 Manufacturers Will Build Line at Tidd Plant, Brilliant, Ohio

To study the problems of transmitting power at voltages as high as 500,000 volts, the American Gas & Electric Service Corp. in cooperation with three utilities and nine manufacturers of electrical equipment will erect for test purposes two 3-phase power lines adjacent to the Tidd plant of Ohio Power Co. at Brilliant, Ohio. The other utilities involved are Appalachian Electric Power Co. and Indiana & Michigan Electric Co.

The mile-and-a-half test lines will be so built and equipped that thorough studies can be made of some of the important factors that control the economic application of transmission voltages higher than 287 kv., the present maximum voltage used.

Investigations will be centered about corona loss, radio interference, and insulation coordination at high voltages. Tests will be made at voltages from 264 to 500 kv. These investigations are expected to provide essential data for the design of transmission lines and terminal equipment for the economical transmission of power at these high voltages in the relatively near future.

Present plans call for materials and equipment for these investigations to be supplied as follows:

Westinghouse Electric Corp. will provide the high-voltage transformers with lightning arresters and the metering equipment to energize the line. Metering equipment of high sensitivity and accuracy will be provided for measuring corona loss and other test phenomena not only for selected conditions, but also for weather conditions as encountered throughout the year.

The transmission line towers to be supplied by the American Bridge Co. will be designed so that various conductor spacings can be used. These towers will permit close simulation of actual service conditions by having three phase conductors and two ground wires.

Transmission line conductors of various types and sizes will be supplied by the Aluminum Co. of America, Anaconda Wire & Cable Co., General Cable Corp., and Phelps Dodge Copper Products Corp. Tests on the conductors will be made under varying conditions of weather, spacing, and insulator string length.

Switching equipment designed for a higher voltage than any heretofore built with lightning arresters, current transformers and potential devices will be supplied by the General Electric Co., in order to obtain experience on these important elements of station equipment.

Insulators and hardware will be provided by the Ohio Brass Co. and the Locke Insulator Corp.

Construction of transmission lines for voltages in excess of the present maximum operating value, 287 kv., is technically feasible at this time, based on experience with lower voltage designs. However, lower cost construction is expected to result from the data which will be obtained with the proposed installation, as the extended knowledge should permit more closely evaluating the margins now believed necessary in the selection of conductor diameter, spacing, insulation levels of line, and terminal apparatus.

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Bills Stamped 'No Charge'

"No Charge" was stamped on each bill sent to customers of the British Columbia Electric Railway Co. for the meter reading taken between November 15 and December 14.

Philip Sporn Wins A.I.E.E. Edison Medal

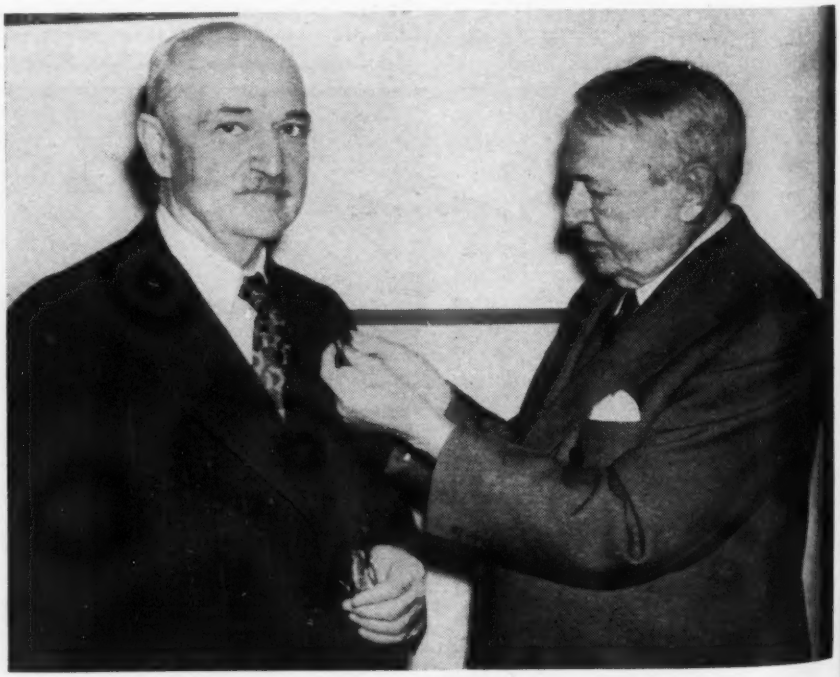
American Gas & Electric Service Corp. Executive Vice-President Honored for Many Contributions

(See Front Cover)

Philip Sporn, executive vice-president of the American Gas & Electric Service Corp., has been awarded the 1945 Edison Medal of the American Institute of Electrical Engineers. The award goes to Mr. Sporn for his contributions to the art of economical and dependable power generation and transmission.

Mr. Sporn has been outstanding as an engineer who has great executive ability. Joining the American Gas & Electric Co. in 1920, he has progressed through the positions of protection engineer, communication engineer, transmission and distribution engineer, station engineer, chief electrical engineer, and chief engineer to his present position. He is now executive vice-president of A. G. & E. and is executive vice-president and chief engineer or director of 15 subsidiaries of the parent organization.

Under his engineering supervision, a high percentage of all the present facilities of the American Gas & Electric Co. systems, whose aggregate value is said to be over $500,000,000, have been decided upon and installed. Over 1,000,000 kw. of generating capacity have been added since 1934. On the whole this represents



AWARD FOR THE PRESIDENT—Herman Russell, left, president of Rochester Gas & Electric Corp., receives a 40-year service pin from Edward G. Miner, chairman of the board. Mr. Russell entered the employ of the corporation on November 1, 1905, and has been president since 1929

one of the largest single continuous programs of utility system expansion.

In 1937, Mr. Sporn proposed the ultra high speed reclosure of circuit breakers which has since been widely accepted as a means of furthering stability and dependability of high voltage transmission circuits. He also carried out pioneer development work in the application of hydrogen to the cooling of alternators and synchronous condensers.

In 1928, he won the A.I.E.E. National First Prize in the Field of Engineering Practice for his paper, "Rationalization of Transmission System Insulation Strength." Subsequent committee work and ensuing papers culminated in 1940 in adoption of basic insulation levels. These specify a rational system of insulation levels for all operating voltages, the values adopted underlying many industry standards. He is still chairman of the joint industry committee.

As a consultant of the War Production Board, he prepared a comprehensive report on the use of silver as a substitute for copper and aluminum as electrical conductors.

Mr. Sporn was graduated from Columbia University in 1917 as an electrical engineer. He is a fellow of A.I.E.E. and the American Association for the Advancement of Science. He is also a member of the American Society of Mechanical Engineers, the American Society of Civil Engineers, and the American Society for Testing Materials.

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Utility Says Government Collected Taxes Illegally

Whether the electric energy tax should be collected for the sale of electricity to customers who use the current for pasteurizing and bottling milk was a question the Federal Court at Louisville, Ky., has been asked to settle.

The suit was filed on behalf of the Kentucky Utilities Co. against Collector Seldon R. Glenn for taxes "erroneously and illegally collected." Return of $2,399.53 plus interest is asked.

The suit charges that six customers using energy in the dairy business were not selling the milk commercially within the meaning of the income tax status.

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Utility Safety Winners

Top honors among all large electric utilities in the United States in the National Safety Council's 1944-1945 contest went to Texas Power & Light Co. with only 2.47 accidents per million man-hours worked. Ohio Public Service Co. was second with a frequency rate of 4.62. The national average is 11.68.

Results of Reorganization Act to Depend on Survey

President Truman signed into law last week legislation giving him broader authority to reorganize the Executive Department of the Federal Government than Congress ever granted his predecessor.

At the same time, ELECTRICAL WORLD learned that there had been prepared by the Budget Bureau as long ago as last June a reorganization plan under which regulatory functions of the Federal Power Commission would be separated from the non-regulatory functions. This plan, apparently, will be superseded, since Mr. Truman declared, in a statement made when he signed the reorganization bill, that the first step would be a survey of all agencies affected, including the FPC which was not exempted.

President Truman warned that reshuffling under the measure could not be expected to result in particularly imposing reductions in administrative expenditures. He pointed out that government programs are created by Congress and are merely carried out by Executive Departments to the extent specified by Congress. Economy was one of the points stressed by the President in his request for the legislation and by administration leaders who fought the measure through Congress.

The President said he would undertake a "systematic review" of government agencies to determine how they can be regrouped to operate most efficiently and economically. He failed to disclose anything specific. He predicted, however, that such regrouping would lead to "greater consistency" in policy and more effective coordination of programs.

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Home Heating Costs Will Be Studied in Portland, Ore.

Experiments to obtain accurate records in home heating costs will be undertaken by the Portland General Electric Co., assisted by engineers of the Westinghouse Electric Corp. and General Electric Co.

Meters and instruments will be installed in 75 typical residences of the more than 300 homes in Portland already equipped for heating by electricity. The test is to be a basis for determining the type of house heating equipment most suitable for the climate and for figuring a rate structure to be offered for electric heating service.

Preliminary figures already have been tabulated for 20 electrically heated Portland homes through 1942, 1943 and 1944. In these inconclusive tests an average heating cost rate of $78.80 annually was indicated. Homes tested ranged from three to eight rooms with power bills from $35 to $142.

DIVISION SAFETY LEADERS—Leaders in the Combination Gas and Electric Division, Group A, of the 1944-45 Safety Contest of the National Safety Council, the 1,200 employees of Wisconsin Public Service Corp. recently were awarded a plaque. They achieved an accident frequency record of 2.72 per million man-hours worked; the national average was 8.34. Presentation of the plaque, by C. E. Kohlhepp, vice-president and general manager, was made at a meeting of employee representatives from the company's various communities and departments. Acceptance was by heads of two union groups representing a large part of the employees

Detroit Edison Plans Refund and Rate Cut

If Approved by Court 3 Years of Litigation Will End—Impounded Refund Totals $16,450,000

A refund of $16,450,000 of impounded federal taxes and a reduction in electric rates amounting to $3,000,000 a year is in immediate prospect for all customers of the Detroit Edison Co., Prentiss M. Brown, chairman of the board, announced last week.

"The company has filed with the Ingham County Circuit Court and forwarded to all parties to the three-year legal controversy a proposed decree effecting the refund and rate reduction which has the approval of the Michigan Public Service Commission," Mr. Brown stated. "The proposal is set for hearing before Judge Archie D. McDonald, of Hastings, sitting in the Ingham Circuit Court on December 31. If approved, only the possibility of an appeal to the Supreme Court by some other of the interested parties could block consummation of the order and end to the litigation," Mr. Brown pointed out.

The determination of the proper disposal of funds accumulated to meet expected federal excess profits tax obligations for 1944 and 1945 has been the principal issue before the Commission and the court. The total amount of $16,450,000 has been paid by the Detroit Edison Co. into a fund now impounded in the custody of the court. A total of $10,450,000 was impounded in 1944, and $6,000,000 in 1945. Six-sevenths of the total would go to the Federal Government if the refund, designed to eliminate the excess profits tax obligation, were not made.

All Customers Share

All Detroit Edison customers, residence, farm, commercial, industrial and municipal, would share in the refund.

The decree directs that refunds be made by a trustee appointed by the court. Actual work would be done by Detroit Edison employees under direction of the trustee. The job would require the issuance of more than 1,000,000 checks. It would be necessary to study in excess of 12,000,000 monthly and bimonthly bills covering the last two years.

Each customer would receive a refund equivalent to about 9 percent of the total of his net electric bills for 1944 and 1945. For each residence and farm customer that would mean an amount slightly more than the average bill for a two-month period.

First checks probably could be ready for mailing late in January, Mr. Brown indicated. It is expected that it would take about four months to complete the job.

The $3,000,000 rate reduction, effective January 1, 1946, which is a part of the proposed decree, would be the forty-first reduction in rates made by the Detroit Edison Co. since 1918.

Residence and farm customers would benefit by this reduction to the extent of about $1,134,000 a year. Benefit to commercial customers would be slightly more than $1,000,000 and to industrial customers slightly less than $1,000,000.

"It is expected that the company will be able to make this additional rate reduction of $3,000,000 a year and still maintain its high standard of service principally because of the recent reduction in federal taxes to be imposed in 1945," Mr. Brown said.

"Concluding this unusually extended period of litigation, the Detroit Edison Co. is happy in the opportunity for a resumption of its long record of cooperative and friendly relations with the Michigan Public Service Commission and with the municipal governments in its territory."

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Surplus Property Sales

Surplus property sales up to November 15 as announced by the Reconstruction Finance Corporation included:

Generator-set units—total cost, $18,060,000; total sales, $1,361,000; on hand, $14,514,000, cost price.

Motors—cost, $2,660,000; sales, $513,000; on hand, $1,775,000.

Switchgear—cost, $1,520,000; sales, $128,000; on hand, $1,297,000.

Transformers—cost, $2,092,000; sales, $530,000; on hand, $1,263,000.

Transmission and substation equipment—cost, $1,615,000; sales, $121,000; on hand, $1,404,000.

Junction and outlet boxes, and box covers—cost $1,134,000; sales, $57,000; on hand, $960,000.

Switches and fuse cutouts—cost, $1,173,000; sales, $46,000; on hand, $1,065,000.

Miscellaneous wiring devices—cost, $1,151,000; sales, $40,000; on hand, $1,049,000.

Other electrical machinery and equipment—cost, $5,501,000; sales, $357,000; on hand, $4,552,000.

Rubber-insulated copper wire—cost, $6,814,000; sales, $389,000; on hand, $6,077,000.

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Named to Maine P.U.C.

George E. Hill has been renominated by Gov. Horace A. Hildreth for a seven-year term as a member of the Public Utilities Commission. A Republican, Hill was first named to the commission in October, 1942.

3-State Co-ops Plan Super-Power System

Would Operate in Arkansas, Oklahoma, Missouri—Power Would Be Secured from Norfork Dam

Rural electric cooperatives in Arkansas, Oklahoma, and Missouri are planning a $220,000,000 tax-financed super-power system that will utilize public power supplies and compete with business-managed companies in the industrial power field.

This was disclosed after a meeting of the Arkansas State Electric Cooperative Corporation in Little Rock. T. E. Bostick of Augusta, manager of the Woodruff Elcctric Co-op and president of the state group, issued a one-sentence statement about the meeting. "A resolution was adopted favoring the construction of a transmission system to serve the co-ops and municipal plants in the state," he said.

Asked to expand upon the statement, Mr. Bostick said the co-ops planned to offer industries power at low rates. He called attention to the fact that Arkansas Power & Light Co. has a contract to purchase the power output of Norfork dam for the duration and six months. "But we can get the power after that," he said. "Congress has specified that municipal plants and rural cooperatives are entitled to buy their needs first."

Will Use Public Power Sources

Mr. Bostick indicated that the co-ops in the three states are planning to use power from Norfork, Grand River dam in Oklahoma, and other public power sources. The present 18 rural co-ops in Arkansas and two proposed co-ops would be associated with co-ops in the other states in the super-power plan, he said. Included also would be the Ark-La holding-company co-op, which was formed with $1,000 capital by five Arkansas and five Louisiana co-ops, and which borrowed approximately $4,000,000 to construct a 154,000 volt transmission line to bring power from Grand River dam to the Jones Mills aluminum plant at Lake Catherine, Ark. This line has been idle for several months since aluminum plant is not operating.

Business-managed electric companies in Arkansas said they could see in the huge tax-financed super power plan efforts to save some of the threatened loss that would be occasioned by continued idleness of the Ark-La line. Last reports show that Ark-La has repaid only about $100,000 of its loan to REA from the line.

Just how this line would be used in the proposed super-power plan was not

announced, and electric company officials point out that it runs through unsettled country to a large extent.

It was also pointed out that the Little Rock Circuit Court has ruled that Ark-La is a public utility and subject to jurisdiction of the state Public Service Commission. Mr. Bostick said that by joining in the super-power plan Ark-La would get out from under this classification.

Mr. Bostick said that the group did not contemplate invading municipalities to take huge power loads served by municipally-owned plants but would sell customers in other areas.

The Arkansas co-ops served by Arkansas Power are now buying power wholesale at a rate that earns them a price of slightly under 6 mills per kw.-hr. at 35 per cent load factor. This can be re-sold by the co-ops for farm use and non-farm use up to 40 kilowatts of demand. Power is purchased by the co-ops at the company's standard wholesale-for-resale rates when sold in amounts exceeding 40 kilowatts of demand.

Mr. Bostick said the new super-power system would be ready in 12 to 18 months.

•

BPA Will Build Office

To provide quarters for expanding personnel, Bonneville Power Administration will build a four-story $600,000 office in Portland, Ore. Of steel and concrete, 100 by 190 feet, it will be erected by Lloyd Corp., Ltd.

Standards for A. C. Power Circuit Breakers O.K.'d

Five new standards on testing, rating and performances of alternating-current power circuit breakers (for rated voltages higher than 600 volts) have been approved by the American Standards Association and are included in one publication designated "C37.4—1945 through C37.9—1945."

Tables of preferred circuit breaker ratings are a feature not found in any previous national standard (other than those of the National Electrical Manufacturers Association). Adherence to these preferred ratings (printed in bold face type) by users and manufacturers should result in economy to both, as compared with previous practice.

Some of the other features are: Minimum operating voltage and insulation test voltages have been added to the tables, and the rated interrupting time, in cycles, is also indicated. It will be noted that the 5-sec. rating is now to be numerically equal to the maximum interrupting current rating in all cases.

In one table listing breakers rated 5-kv. or higher, only 28 standard ratings remain, in comparison with 41 previously.

Among the changes in other tabular listings are:

Ratings of 3,500,000 kva. for future development are listed for 138 kv. and higher voltages, and of 5,000,000 kva. for 287.5 kv. and above.

For breakers rated 115 kv. and above, the 800-amp. rating is now standard, instead of 600 and 1,200 amp., except that two 1,200-amp. ratings are retained (one each in the 115-kv. and 161-kv. classes). For breakers rated 230 kv. and above, the 800-amp. rating is the only one listed.

In the 115-kv. class, instead of four ratings, only three are now listed. The 500,000-kva. and 1,000,000-kva. breakers are no longer standard, but a 2,500,000-kva. breaker is now listed.

In the 138-kv. class, there are likewise only three breaker ratings listed instead of four. The 750,000-kva. breaker is no longer standard, but breakers of 1,500,000, 2,500,000, and 3,500,000 kva. are now listed.

In the 161-kv. class, three are listed as compared with two previously. The new listings are for 2,500,000 kva. and 3,500,000 kva. The 1,500,000-kva. breaker is no longer listed.

•

4 Property Owners File Suit to Stop P.U.D. Deal

Suit has been filed in Superior court at Vancouver, Wash., by four property owners, asking that recent action by the Clark County Public Utility District No. 1 in closing a deal with the Ballard-Hassett Co. of Des Moines, Iowa, be adjudged unlawful and void.

The P.U.D.'s designs for floating a $1,000,000 bond issue with Ballard-Hassett to finance acquisition of properties of the Portland General Electric Co. may be blocked on the property owners' allegation that the utility failed to ask

FIRST SECTION OF 100,000 CROWD—W. G. Moore, vice-president and general manager of Dallas Power & Light Co., and C. A. Tatum, Jr., general sales manager, on the speakers platform at the opening of the Electric Home Exposition on the ground floor of the utility's building in Dallas. Indications early this week were that over 100,000 persons would see the displays of appliances by dealers and manufacturers. The exposition opened December 1 and closed today

for bids on the issue. The P.U.D. had planned to take over Portland General Electric properties in Clark County, January 1. Valuation of the property was fixed at $801,000 by a jury in Federal Court at Tacoma, Wash.

•

Electric Utility Lawyers Form FPC Bar Assn.

Representatives of electric power companies which appear before the Federal Power Commission have been invited to join the newly organized FPC Bar Association.

Organized to provide "a vehicle for taking joint action in making constructive recommendations to the Federal Power Commission with respect to its rules, regulations, practice and procedure and to assist and cooperate with the commission in these and other matters," the association elected as its first president Carl I. Wheat, of San Francisco and Washington, a member of the firm of Wheat, May and Shannon. Generally speaking, the new association will function in much the same way as the bar associations of the Interstate Commerce Commission and the Federal Communications Commission, both of which have proved valuable to these commissions and to those practicing before them.

The new agency authorized a special committee to wait upon members of the Commission to offer the cooperation of the new organization and to obtain such suggestions as FPC members may offer.

In addition to Wheat, the Association elected C. Huffman Lewis, of Shreveport, La., first vice-president; Randall J. LeBoeuf, Jr., of New York, second vice-president; Stanley M. Morley, of Washington, secretary; James W. Haley, Washington, treasurer; and Richard J. Conner, John R. Curry, Tom J. McGrath, J. Ross Gamble and Charles S. Rhyne, all of Washington, and William A. Dougherty, of New York, executive committeemen.

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10-Mile Cable Planned

Plans for the installation of a 40-kv. nitrogen gas-filled cable between Milo and Canal substations of the Columbus & Southern Ohio Electric Co., Columbus, Ohio, have recently been announced. Installation of the upwards of 51,000 ft. of single-conductor cable is scheduled to begin soon after the first of the year, it was stated. Arrangements are to be provided for a continuous supply of nitrogen gas under 15 psi. to cable joints through lead tubing external to the cable. Cable for the proposed circuit is to be supplied by Okonite-Callender Cable Co. Completion is expected by April, 1946.

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Central New York Power Workers Pick A.F.L. Union

The International Brotherhood of Electrical Workers (A.F.L.) has been certified as collective bargaining agent for all technical, office and clerical employees of the Central New York Power Corp., of Syracuse.

I.B.E.W. received 294 of 576 valid votes cast in an election held by the National Labor Relations Board. The United Mine Workers, District 50, received 171 votes, while 70 were cast for a third participating organization, and 41 for none.

•

Fights Municipal's Plans

The Sierra Electric Cooperative has taken to the New Mexico Supreme Court its attempt to have the town of Hot Springs, N. Mex., enjoined from building and operating electric transmission and distribution lines in Sierra County. The co-op has appealed to the higher court from an order of District Judge Charles H. Fowler dismissing the injunction action.

Increase in Coal Exports to Freed Countries Asked

War Mobilization Director John W. Snyder has moved to boost coal exports to liberated countries as United States fulfillment of its solid fuel commitments dropped 2,200,000 tons behind schedule in five months.

Snyder asked the Labor Department to bend every effort to settlement of a tugboat strike in Philadelphia, which has cut hard into scheduled shipments. He asked the Solid Fuels Administration to make every effort to meet December quotas, including the delivery of Utah coal to Pacific Coast ports for shipment, and asked the War Shipping Administration to increase tonnage at various ports, particularly Hampton Roads, where shipments have been only 25 percent of capacity.

At present shipping rates, this country will have lagged 2,192,400 tons behind its commitments by January 1, Snyder declared, mainly because of the Philadelphia tugboat strike and the September coal strike. In addition, insufficient ships at ports where coal was ready and insufficient coal at ports where ships were on hand cut down the total.

German exports, Snyder said, have fallen far short of expectations.

MEETINGS

Edison Electric Institute—Transmission and distribution committee, Netherland Plaza Hotel, Cincinnati, Ohio, February 18-19; electrical equipment committee, Netherland Plaza Hotel, Cincinnati, Ohio, February 20-21. Col. H. S. Bennion, managing director, 420 Lexington Ave., New York 17, N. Y.

Previously Listed

American Institute of Electrical Engineers—Winter convention, New York, N. Y., January 21-25; northeastern district, Buffalo, N. Y., April 24-25. H. H. Henline, secretary, 33 W. 39th St., New York 18, N. Y.

Institute of Radio Engineers — Winter technical meeting, Astor Hotel, New York, N. Y., January 23-26. Haraden Pratt, secretary, 330 W. 42nd St., New York 18, N. Y.

National Association of Purchasing Agents—Public Utility Buyers' Group, midwinter convention, Edgewater Beach Hotel, Chicago, Ill., February 4-5. R. C. Wenz, chairman, Philadelphia Co., Pittsburgh 19, Pa.

Pennsylvania Electric Association—Systems operation committee, Roosevelt Hotel, Pittsburgh, Pa., February 6-7; A. R. Deck, chairman, Metropolitan Edison Co., 412 Washington St., Reading, Pa. Transmission and distribution committee, Benjamin Franklin Hotel, Philadelphia, Pa., February 7-8; C. C. Moler, chairman, The Potomac Edison Co., Hagerstown, Md. Electrical equipment committee, Roosevelt Hotel, Pittsburgh, Pa., February 14-15; B. E. Hagy, chairman, Philadelphia Electric Co., 900 Sansom St., Philadelphia, Pa.

Canadian Electrical Association—Winter conference, Chateau Frontenac, Quebec City, February 11-12. B. C. Fairchild, managing director, 704 Tramways Bldg., Montreal, Canada.

Missouri Valley Electric Association — Power sales conference, Hotel Continental, Kansas City, Mo., February 13-14; engineering conference, Hotel Continental, Kansas City, Mo., April 10-12. I. D. Pettegrew, director, 1004 Baltimore St., Kansas City 6, Mo.

American Society for Testing Materials—Spring meeting, Pittsburgh, Pa., February 25—March 1. R. E. Hess, assistant secretary, 260 S. Broad St., Philadelphia 2, Pa.

National Rural Electric Cooperative Association—Annual meeting, Buffalo, N. Y., March 4-6. Avery C. Moore, secretary-treasurer, 416 5th St., N.W., Washington 1, D. C.

North Central Electrical Industries — Convention and trade exposition, Radisson Hotel, Minneapolis, Minn., March 10-14. W. A. Ritt, secretary-manager, 234 Foshay Tower, Minneapolis, Minn.

Edison Electric Institute — General sales conference, Edgewater Beach Hotel, Chicago, Ill., April 2-4. Col. H. S. Bennion, managing director, 420 Lexington Ave., New York 17, N. Y.

Midwest Power Conference—Annual meeting, Palmer House, Chicago, Ill., April 3-5. S. E. Winston, director, Illinois Institute of Technology, Chicago 16, Ill.

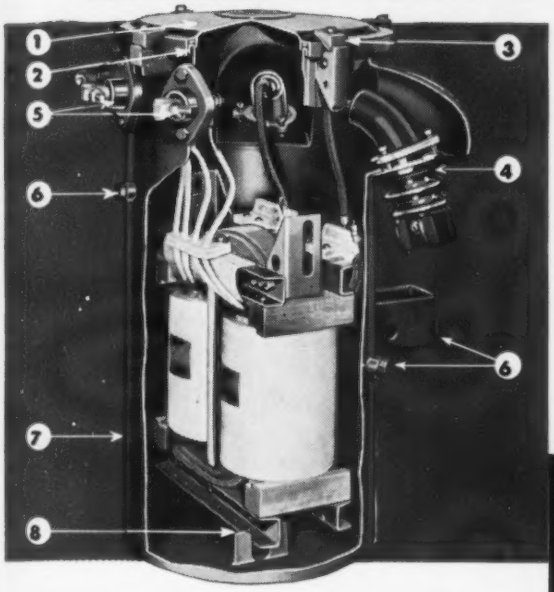
National Electrical Manufacturers Association — Spring meeting, Palmer House, Chicago, Ill., week of April 8. W. J. Donald, managing director, 155 E. 44th St., New York 17, N. Y.

Electrochemical Society—Spring meeting, Tutwiler Hotel, Birmingham, Ala., April 10-13. Colin G. Fink, secretary, Columbia University, 3000 Broadway, New York 27, N. Y.

National Electrical Wholesalers Association—Annual convention, Stevens Hotel, Chicago, Ill., April 21-25. C. G. Pyle, managing director, 500 Fifth Ave., New York, N. Y.

International Lighting Exposition—Stevens Hotel, Chicago, Ill., April 25-30. A. B. Coffman, manager, 111 W. Jackson Blvd., Chicago 54, Ill.

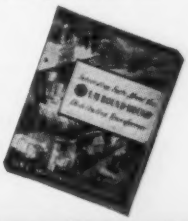
Why not get All This and L-M Round-Wound, too!



L-M Round-Wound transformers offer many design and construction features that make them a sound investment. Some of these are shown in the illustration at the left. In addition, these transformers offer many desirable electrical characteristics which result from Round-Wound design: improved regulation at all power factors; a better ratio of losses; lower exciting current and lower reactance; and lower cost of operation. It will pay you to make a thorough investigation.

Write for bulletin RW-421

Ask the L-M Field Engineer for a copy of this informative bulletin. Or write Line Material Co., Transformer Division, Zanesville, Ohio.



LEAK-PROOF TANK AND BUSHINGS

1. Cover—strong, rigid, will not distort. Skirted edge keeps rain off gasket.

2. Gasket held in double channel in cover; tank edge rolled, will not cut gasket.

3. Four cover clamps; assure tight seating of cover, easy removal if needed.

4. High voltage bushings double sealed; protected by pocket on tank. Available in cover mounted types.

5. Low voltage bushings stud-type; oil-tight; external clamp, easily removed.

6. EEI-NEMA standard brackets and ground pads.

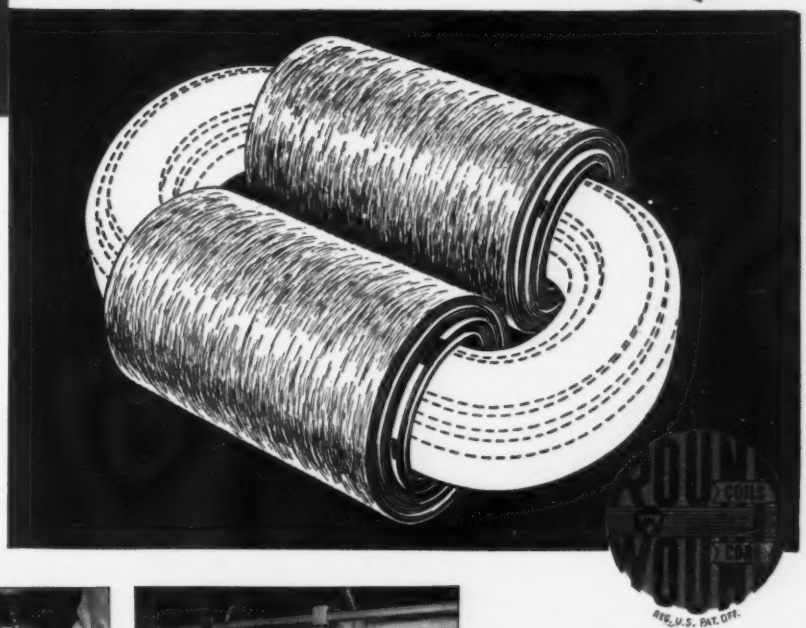
7. Copper-bearing rust-resisting steel tank triple-coated. Upside-down test of filled transformer assures freedom from oil leakage.

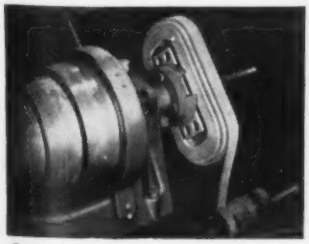
8. R-W core-coil assembly rigidly mounted top and bottom. Twelve tough tests assure correct performance of the complete unit.

Also available with simple, rugged tap-changer; handle and indicator above oil level.

SIZES and RATINGS

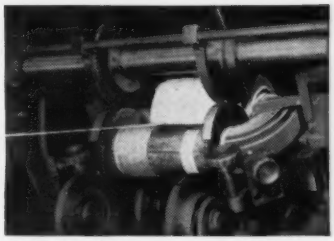
Available in ratings from 1½ to 25 Kva, 2400 to 7620 volts. Meet latest EEI and NEMA standards.





Core is Wound with the grain under tension, in elliptical shape closely approaching ideal magnetic circuit; then clamped and annealed. Not cut, or unwound after annealing. No air gaps; stable characteristics.

Round Coils wound right onto core. Geared split flanges are placed around core legs; then an insulating paper form is wound on. This winding form is revolved in the machine by the geared flanges, which are later removed.

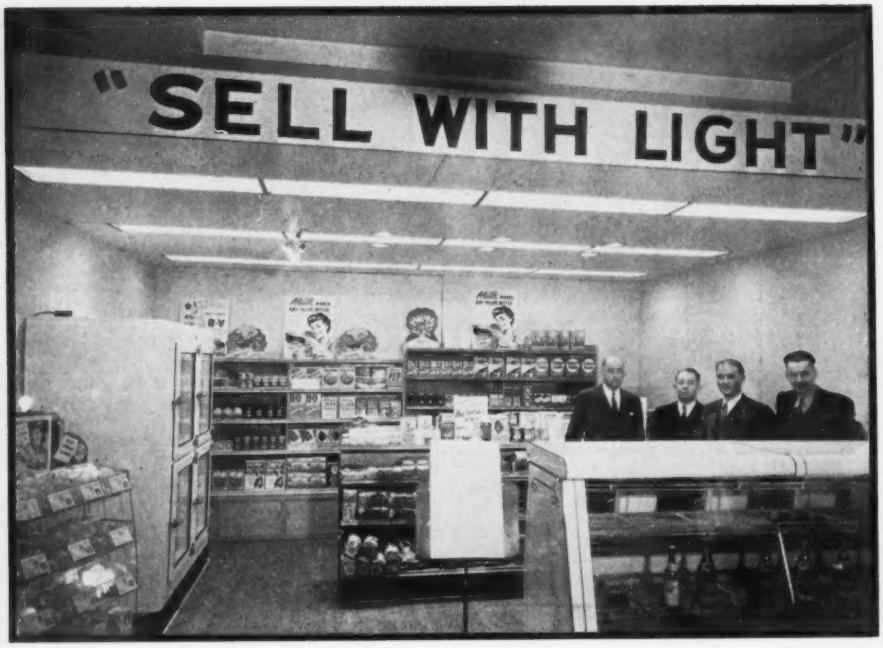


Winding Process assures even tension, no air spaces between layers. Even, round coils; generous undisturbed insulation, permit fewer turns, lowering resistance and reactance. Oil duct spacers wound into coils eliminate any hot spots.

The Round-Wound principle provides basically correct core—the right material, wound into ideal shape, without air gaps; undisturbed after annealing. Long round coils envelop a maximum of the iron circuit, take maximum advantage of the magnetic field. Cruciform cross-section core, and spacers wound into coils assure even, efficient cooling.

LINE MATERIAL
TRANSFORMERS

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street Lighting Equipment



COOPERATION—Northwest Electric Light & Power Association sponsored this exhibit at the Oregon Food Merchants Association convention in Portland. To make the exhibit possible, eleven firms furnished the lighting fixtures and lamps, store design and fixtures, display goods, and construction services while six utilities operating in Oregon underwrote the project. Left to right are M. S. Glenn and D. O. Bergey of Northwestern Electric Co. and T. W. Fitch and L. J. Collins of Portland General Electric Co. Other power companies backing the project were California Oregon Power Co., Eastern Oregon Light & Power Co., Mountain States Power Co., and Pacific Power & Light Co.

2,500,000 LIGHT BULBS SOLD—Duquesne Light Co.'s 1945 All-Dealer Light Bulb Campaign resulted in sales estimated at 2,500,000 or 7 bulbs per customer. Employees sold 852,659 as compared with 706,319 bulbs in the last campaign in 1941. Orders taken by employees were sent to dealers in the customers' district. G. W. Ousler, second from the right, vice-president in charge of sales, checks sales figures with George A. Gardner, right, manager of residential sales. Members of his department are sorting the orders sent in by employees

QUICK HEAT—In a matter of s -in. hot temperatures by induction h H Ohio Crankshaft Co. demonstrat roc Frequency Heating Conference l ent at right is used for brazing flang typ

MAKING A SCHOOLROOM HEA —I Burlingame, Calif., school where ry lamps have been mounted aroun ach air. A study has shown that the l e diseases and in improving the at e r

THE IND

IN PICT E

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Here Harlan A. Messner of the
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-type drain pipe

—This is one of the rooms in a
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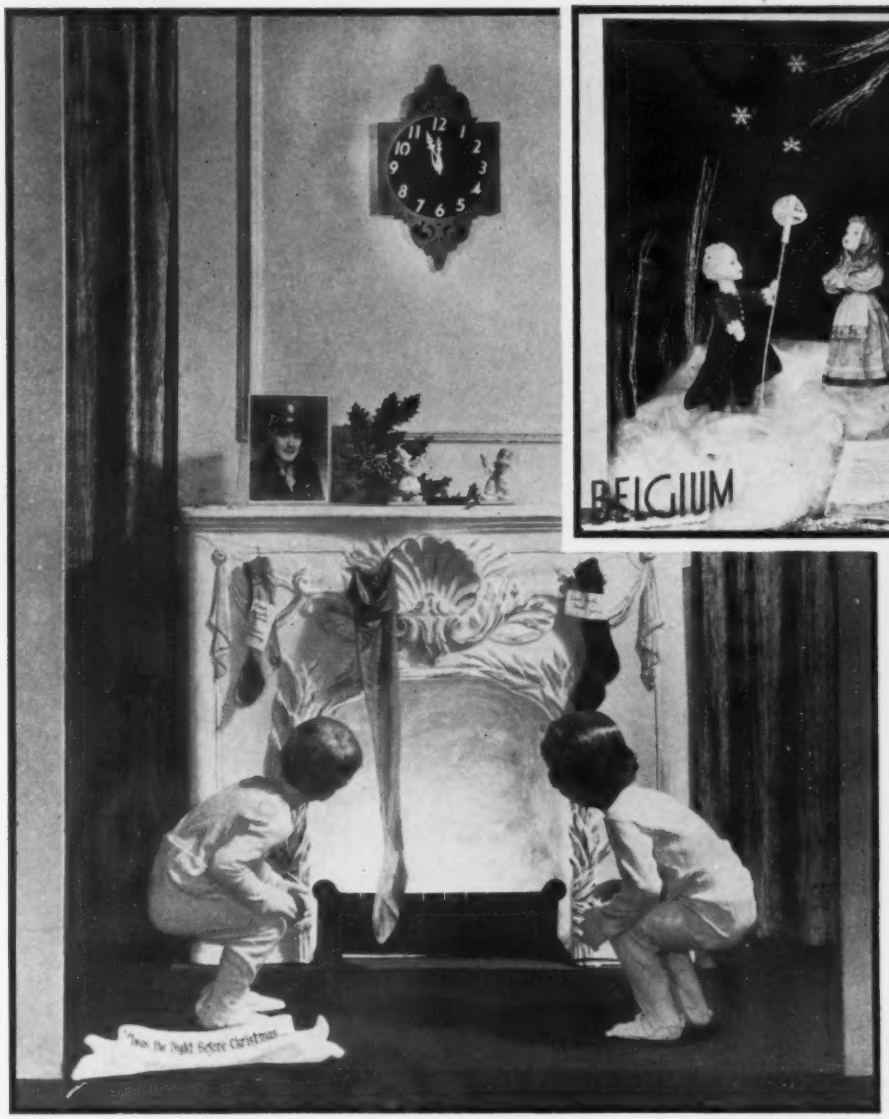


UTILITY GETS SENTIMENTAL AND THE CUSTOMERS LOVE IT—"Jim and Jane," popular "twins" of the Consumers Power Co.'s window display, " 'Twas the Night before Christmas," are giving a repeat performance this year in the company's Michigan stores. At upper right and below are selections from "Christmas in the Allied Nations"—the series of nine displays featuring Yuletide costumes and customs in Russia, England, China, United States, France, Holland, Belgium, Norway, and Greece that are appearing serially in Consumers Power Co. windows

ID STRY

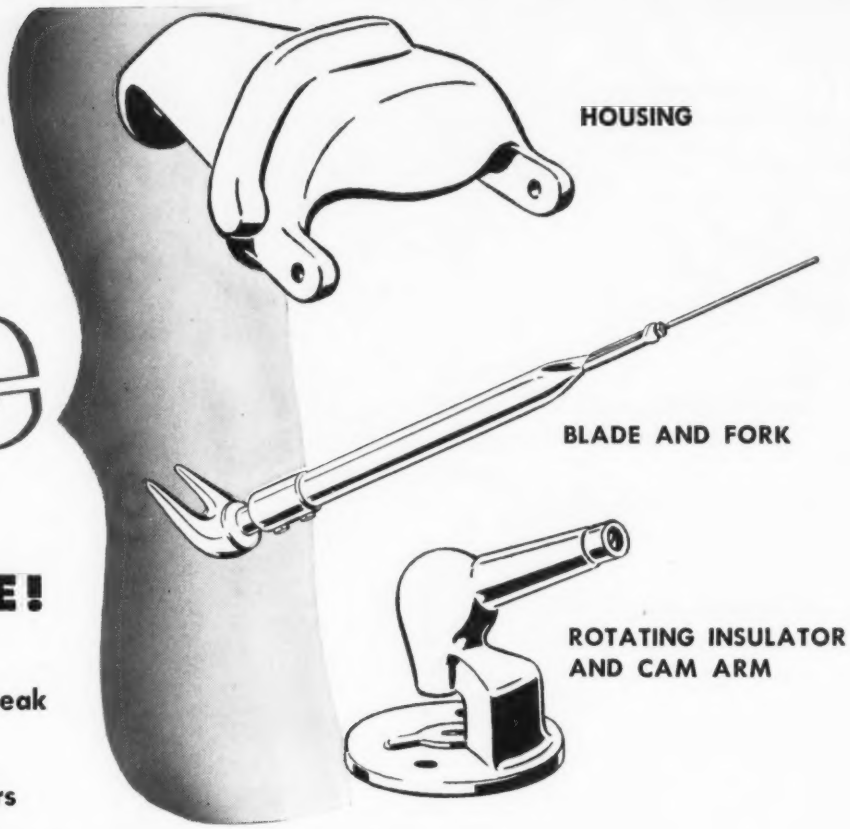
CTES

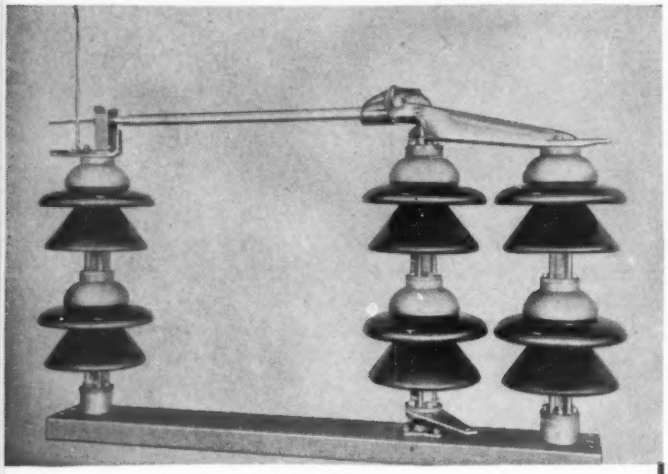
ONLY

three

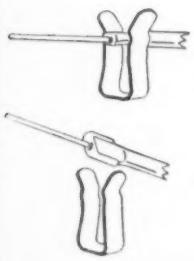
PARTS MOVE!

- no shunts to corrode or break
- no gears to maintain
- no exposed links or levers





Break is easy — but contact is always secure



Special shape of break-jaws helps to lock blade in closed position as further insurance against any movement due to short-circuit current stresses.

operation is easy
action is positive
maintenance . . extremely low

The opening action of the new Westinghouse Type V Outdoor Disconnecting Switch is simple and positive. A groove inside the high-strength copper alloy housing follows the roller cam as it (1) rotates the contact arm, and (2) lifts housing and arm approximately 90 degrees in a vertical arc. That's all.

Operation is easy—even when contacts are sealed by ice or corrosion. Movement is steady and uniform, under positive control at all times. Contact wear is minimized because contact pressure is *completely released* before the vertical lift is initiated.

Ratings range from 7½ to 230 kv, 400 to 2000 amperes. For complete information, write for Booklet B-3480. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-60576

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

TYPE V OUTDOOR DISCONNECTING SWITCH

Washington Award Group Elects F. Lane Chairman

F. H. Lane, manager, Engineering Division, Public Utility Engineering & Service Corp., Chicago, has been elected chairman of the Washington Award Commission for 1946. The commission will select an outstanding American Engineer as recipient of the Washington award. This award is presented each year in recognition of devoted, unselfish and pre-eminent service in advancing human progress.

The late John W. Alvord, past president of the Western Society of Engineers, in 1916 proposed the establishment of an honor award by the society and donated a fund for its maintenance. Scope of the award was later enlarged and the name "Washington Award" adopted as a reminder that the first president of the United States was an engineer.

Recipient of the 1945 award was Arthur H. Compton for his research and teaching in the physical sciences, increasing man's knowledge of the action of X-rays and cosmic rays.

The current representatives of the various engineering societies on the Washington Award commission are as follows: The Western Society of Engineers, F. H. Lane, chairman, Ovid W. Eshbach, F. G. Gordon, P. Harrington, W. V. Kahler, M. M. Leighton, Homer K. Smith, H. C. Townsend and C. Earl Webb; American Society of Civil Engineers, Ralph H. Burke and C. B. Burdick; American Institute of Mining and Metallurgical Engineers, G. P. Halliwell and H. M. St. John; American Society of Mechanical Engineers, John R. Michel and H. S. Philbrick; American Institute of Electrical Engineers, Harry B. Gear and L. R. Mapes.

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Columbus, O., Will Spend $1,057,200 on Its Plant

Columbus, Ohio, will spend approximately $1,057,200 to increase the capacity of its municipal plant 23 percent. Important items in the expansion program are generating equipment of 12,500-kw. capacity, $596,000; a 150,000-lb. per hour boiler, other equipment, and a building addition, $460,000.

The utility has $600,000 in its treasury, and a $500,000 bond issue will be floated.

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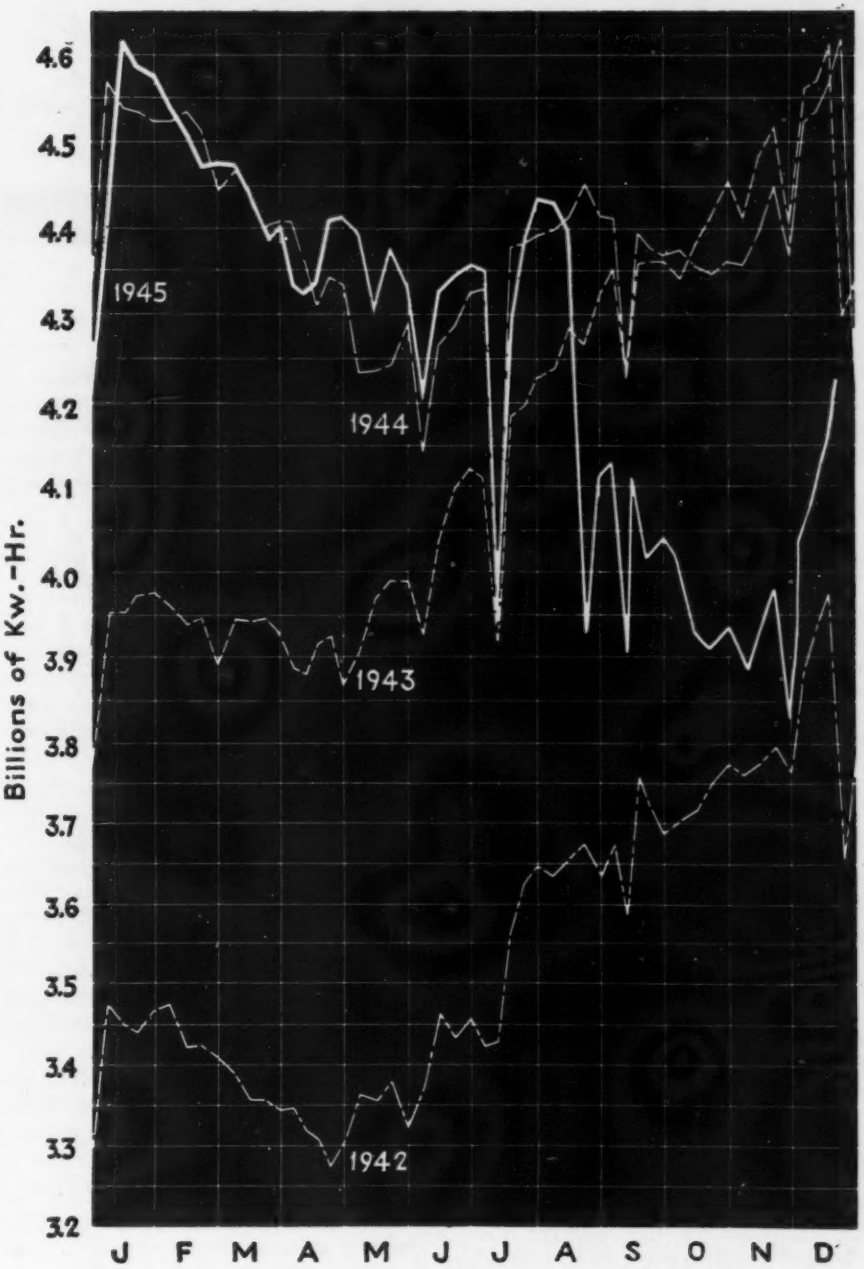
Pay Raise Announced

Detroit Edison Co. has announced a five percent pay increase for all employees, totaling 7,600.



Output Curve Continues to Climb

The electric output curve again moved upward during the week ended December 22, 1945, according to an estimate made by the Edison Electric Institute. Final figures, delayed by the Christmas holiday, will be published in January 5 issue.

E.E.I. placed the estimated amount of electrical energy distributed by the light and power industry for the week ended December 22 at 4,225,000,000 kw.-hr., compared with 4,154,061,000 kw.-hr. during the preceding week. During the week ended December 23, 1944, the amount of electrical energy distributed amounted to 4,616,975,000 kw.-hr., this year's estimated figure representing a decrease of 8.5 percent.

No regional percent changes were available.

Weekly Output Millions Kw.-Hr.

1945		1944		1943	
Dec. 22	4,225	Dec. 23	4,617	Dec. 25	4,295
Dec. 15	4,154	Dec. 16	4,563	Dec. 18	4,613
Dec. 8	4,097	Dec. 9	4,538	Dec. 11	4,567
Dec. 1	4,043	Dec. 2	4,524	Dec. 4	4,560
Nov. 24	3,841	Nov. 25	4,369	Nov. 27	4,403
Nov. 17	3,985	Nov. 18	4,450	Nov. 20	4,513
Nov. 10	3,948	Nov. 11	4,397	Nov. 13	4,483
Nov. 3	3,899	Nov. 4	4,355	Nov. 6	4,414
Oct. 27	3,937	Oct. 28	4,358	Oct. 30	4,453
Oct. 20	3,915	Oct. 21	4,345	Oct. 23	4,415
Oct. 13	3,931	Oct. 14	4,355	Oct. 16	4,382
Oct. 6	4,028	Oct. 7	4,375	Oct. 9	4,342

Percent Change from Previous Year

	Week Ending		
	Dec. 22	Dec. 15	Dec. 8
New England	—	— 3.2	— 2.0
New Atlantic	—	— 2.7	— 2.2
Central Industrial	—	— 11.4	— 12.7
West Central	—	— 1.7	— 1.6
Southern States	—	— 12.3	— 13.6
Rocky Mountain	—	— 1.3	— 1.3
Pacific Coast	—	— 10.8	— 12.5
Total United States	— 8.5	— 9.0	— 9.7

NEWS ABOUT PEOPLE

M. W. Straus Takes Office As Reclamation Director

Michael W. Straus, who was recently appointed Commissioner of the Bureau of Reclamation to replace Harry W. Bashore, retired, (ELECTRICAL WORLD, December 15, Page 10), has worked intimately with the Bureau of Reclamation for more than 12 years. Mr. Straus entered government service in 1933 as

M. W. Straus

an assistant to the Federal Public Works Administrator. In various offices and in extended visits to the areas of operations in the West, he has devoted his effort since joining the Federal service to resource development and construction with the exception of one period. During the war, at the request of Donald Nelson, he was drafted into the War Production Board for a year as director of the War Production Drive Labor-Management Committee.

He returned to the Interior Department in 1943 and in March of that year was named First Assistant Secretary of the Interior. Since then, by delegation of Secretary Ickes, he has had immediate supervision of the Bureau of Reclamation, the Bureau of Mines, the Geological Survey and the Petroleum Conservation Division—all western resource development agencies of the Department of the Interior. In the past year, one of his principal interests was the post-war Reclamation program.

A native of Chicago, Mr. Straus received his education at the University of Wisconsin and engaged in newspaper work in Chicago and New York before going to Washington as a press association correspondent.

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▶ WALTER E. BEATY, who has been connected with the Cincinnati Gas & Electric Co. and predecessor organizations for 44 years, has retired. Since 1930 he had engaged in work on estimates and budget control for the electric distribution department. He joined the Cincinnati utility in 1901 as electric meter reader and repairman and after advancement to head of the department was later transferred to the engineering department where he became assistant to the department head. In 1910 he was appointed assistant superintendent of electric distribution. When the Columbia Engineering & Management Corp. was formed in 1926, he was transferred to the new organization to take charge of electric transmission and distribution engineering work. He rejoined Cincinnati Gas in 1930.

▶ CARL H. NEITZKE, Manitowoc and formerly Calumet county agent, has been named state rural electrification coordinator at the University of Wisconsin. He was appointed under terms of a 1945 law, which transferred the rural electrification division from the state agriculture department to the university. His new duties include distributing all available information on rural electrification and safe uses of electricity on farms and aiding rural electric cooperatives as well as private and municipal utilities in their respective rural electrification programs.

▶ BINGHAM H. VAN DYKE has been appointed manager of the new products department by the Elliott Co., Jeannette, Pa. Previously assistant to the director of research and development, Mr. Van Dyke became identified with the Elliott Co. after an association with the War Production Board, where he was deputy chief of the heat exchanger and pressure vessel branch.

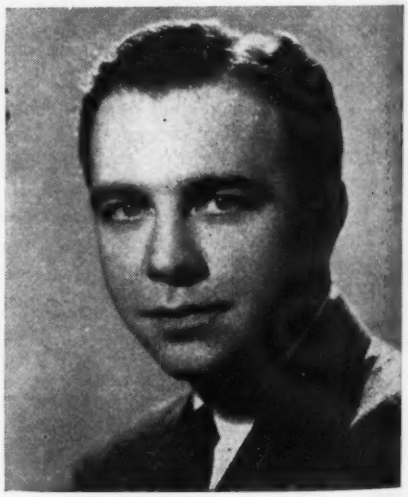
Vice-Presidents Elected by Commonwealth Edison

At a recent meeting of the board of directors of Commonwealth Edison Co., Otto Gressens, comptroller, was elected

O. Gressens

vice-president and comptroller, and Roy A. Dingman, manager of industrial relations, was elected vice-president in charge of industrial relations.

Mr. Gressens, comptroller of the company since 1935, was previously auditor and has been associated with



R. A. Dingman

the company or its subsidiaries since 1927. A graduate of the University of Illinois in the class of 1921, he received his Ph.D. degree in 1927.

Mr. Dingman started with the company in 1928 as a senior clerk in the employment division, was appointed assistant manager of industrial relations in 1937, and has been manager of industrial relations since 1943. He is a University of Wisconsin graduate.

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▶ CHARLES S. LEOPOLD, consulting engineer of Philadelphia, has been elected president of the American Society of Refrigerating Engineers. Mr. Leopold

designed and superintended the installation of the electric power and lighting, air-conditioning, refrigerating, heating, ventilating and elevator systems in the Pentagon Building of the War Department in Washington.

▶ROY B. WILLIAMS, who supervised construction on the Kittitas Division of the Yakima Project of the Bureau of Reclamation in eastern Washington and who directed the building of several other outstanding irrigation works for the government, has arrived at Coulee Dam from Friant, Calif., to become assistant supervising engineer for the Columbia Basin Project, the Bureau's No. 1 post-war development. Well known in the Pacific Northwest, Mr. Williams has spent 33 years with the Bureau, the last six as construction engineer for the Friant Division of the Central Valley Project in California. Mr. Williams' latest assignment before going to Coulee Dam as assistant to Supervising Engineer Frank A. Banks found him in charge of the construction of the Friant Dam of the Central Valley Project and the building of the Friant-Kern and Madera canals of that development.

▶WARREN R. POLLARD, since 1930 manager of the transportation division of Georgia Power Co., has resigned to become president of the Virginia Transit Co., with headquarters in Richmond. He will assume his new duties on January 15.

▶MARSHALL LASHER, for nineteen years assistant to the executive vice-president of Hubbard & Co., Pittsburgh, Pa., has been appointed manager of Hubbard & Co., California, and assistant to W. W. Glosser, vice-president of Hubbard & Co., California. Mr. Lasher has been with the organization since 1922, always in an executive position.

▶DR. WILLIAM D. COOLIDGE, formerly vice-president and director of research of the General Electric Co., who is now touring South America, has been awarded the "Orden al Merito" ("Order of Merit") of the Chilean Government. The award was conferred at a reception at the University of Chile in Santiago, tendered by the Faculty of Medicine and the Faculty of Physics and Mathematics.

▶J. L. DEFANDORF has been appointed general engineering supervisor over rubber mill, synchronous motor, valve control, public works, short orders, textile, paper and printing equipment divisions of Cutler-Hammer Inc., Milwaukee. Mr. Defandorf has been identified with the Cutler-Hammer organization since 1917. He holds a number of patents on electric controller inventions.

E. H. Hammond Retires

Edgar H. Hammond, who has been associated with the wire and cable industry for more than 50 years, retires on December 31, as vice-president and general sales manager of the Kennecott Wire & Cable Co. Mr. Hammond started his career in the Chicago office of the American Electrical Works in 1894. In 1914, he went to the general office at Phillipsdale, R. I., as general sales manager.

The Kennecott Copper Corp. purchased the American Electrical Works in 1935, and changed the name of that company to the Kennecott Wire & Cable Co. Mr. Hammond was appointed vice-president and general sales manager, the position he occupied until the time of his retirement.

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▶HOMER C. CLARK has been appointed manager for the southern district of the Columbus & Southern Ohio Electric Co., with headquarters in Columbus. Mr. Clark succeeds S. M. HAFFEY, retired. Mr. Clark first began work in the utility field with the Athens Electric Co., which later became a part of the Southern Ohio Electric Co., which merged with the Columbus Railway Power & Light Co., now known as the Columbus & Southern Ohio Electric Co.

▶LEROY L. BENEDICT has been appointed assistant general supervisor of Consumers Power Co.'s electric production, transmission and construction department, with offices in Jackson, Mich. For the past 25 years, Mr. Benedict has been superintendent of the department's western division, with headquarters in Grand Rapids. In his new position he will assist Vice-President Frank G. Boyce in supervising the operation and construction of electric plants and transmission facilities throughout the area served by Consumers. Mr. Benedict served with Michigan Power Co. in Lansing from 1910 through 1919, and then joined Consumers. He is a member of the American Society of Mechanical Engineers, the Michigan Engineering Society and a former president of the Grand Rapids Engineering Society. LEO M. DAY, in charge of safety and operating instruction in the western division, has been appointed assistant division superintendent. He will act as superintendent temporarily.

▶IRA M. CUSHING has been appointed electrical engineer of the Office of Hollis French, consulting engineers, Boston, Mass., with headquarters at 210 South St. He served as an estimating engineer for E. B. Badger & Sons Co., Boston, for the past three years; was with the Boston Edison Co. in electrical engineering work for 18 years, and prior to that was with General Electric for 18 years, serving as switchboard specialist in the New England headquarters office for a considerable period.

▶ROBERT G. WATSON, superintendent of the city power plant at Edmonton, Alberta, Canada, has resigned because of ill health. Mr. Watson received his engineering education in Scotland and obtained his early experience with a marine company in London. For a time he worked in South Africa on the construction and operation of copper mining equipment in the Belgian Congo and Northwest Rhodesia. One of his biggest assignments has been the mechanical engineering position at the $72,000,000 Beauharnois canal project from 1929 to 1932.

▶M. B. PENN, formerly assistant chief agricultural engineer of the Alabama Power Co. has returned to that utility after four and a half years in military service. Mr. Penn is now chief agricultural engineer.

OBITUARY

▶LESLIE L. DYER, for 37 years prior to his retirement in 1939 affiliated with the Southern California Edison Co., Ltd., and its predecessors, died on August 24. Born in Abbot, Ia., in 1878, Mr. Dyer first became affiliated with the San Gabriel Electric Co., Los Angeles, Calif., as assistant dynamo tender in 1902 and, after holding several operating positions, in 1917 was appointed assistant superintendent of transmission of the Southern California Edison Co., the organization which resulted from the merger of several light and power systems. Five years later he was appointed superintendent of substation operation for the entire Edison system, the position he held until his retirement in 1939. Under the pressure of the manpower demands of World War II, Mr. Dyer went on active duty in July, 1941, as a civilian electrical inspector for the U. S. Navy at a Terminal Island shipyard, where he remained until 1944, when failing health forced him to relinquish his activities. Mr. Dyer was a member of the American Institute of Electrical Engineers.

▶WILLIAM P. MACDONALD, manager at Nanaimo, B. C., for the British Columbia Power Commission, died at his home in that city on November 30. He was 53 years of age. Mr. Macdonald was manager there for the Nanaimo-Duncan Utilities since 1931 and when this unit was taken over by the government commission a few months ago, he continued as manager.

MANUFACTURING MARKETS

Future Range Units Have Speed, Control

"A peep into the future" of electric cooking is foreshadowed by the new Proctor electric ranges which are now on display at the Chicago Housewares Show. The "peep" included a look at the new surface unit which has a "supercharger" for quick heat and a thermostat for controlled surface unit temperature.

The heating coil is embedded in a heat conductive cement. The "supercharger" effect is obtained by a switch arrangement which overenergizes the element four times its normal operating wattage (from 1,200 to 4,800 watts) for 35 to 40 seconds. When the peak temperature has been reached, the switch automatically provides for a return to the normal 1,200 watts (agitated boil) or 250 watts (slow boil), whichever has been set on the control knob.

Demand of the range is limited by a load-dropping wiring circuit. When the "supercharger" goes into action, the oven circuit, if it should be closed, is opened. A delay flash provides the same safeguard should two or more "superchargers" be used at the same time.

The thermostat is a 2-in. disc mounted on a spring dial, which normally stands about one-eighth inch above the center of the unit. The surface cooking temperatures are "dialed" in the same manner as with an oven regulator.

Life of the unit is unknown at present but laboratory life tests of 20,000 hours of operation have already been run. The company has also made tests of about 30,000 successive flashes on the "supercharger."

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"Magic of Fluorescence"

"Magic of Fluorescence," a colorful 15-minute sound movie, has recently been released by G.E. Lamp Department at Nela Park, Cleveland. Produced by the G. E. Lamp Department and Raphael G. Wolff Studios of Hollywood, the new film is designed to give lighting people, students, and the general public a quick and convincing picture of fluorescent lighting's history.

SPEED AND CONTROL—Joseph W. Myers, vice-president in charge of research, Proctor Electric Co., explaining the operation of the thermostat in the new surface unit to Mary R. Riedel, director of the company's information center

New Lighting Course Made Available

A comprehensive lighting course, designed to give sales personnel of utility companies, distributors and others interested in the subject a speedy, thorough grasp of up-to-date lighting practices, has been wrapped up in a single package by the Westinghouse Electric Corp.

In production for more than a year, the course consists of 18 sound slide films and recordings, one instructor's manual, ten sets of lesson books and one lighting handbook. Titled "Illumination—Fundamentals and Application," the course will be available at cost from the company.

Sound slide films were selected, explained D. W. Atwater, manager of commercial engineering for the Westinghouse Lamp Division, "because visual instruction, as demonstrated by its successful usage in military training, is about the simplest method of imparting knowledge. Sound slide films are particularly well adapted to this purpose."

The course subjects, each covered by a separate sound slide film which occupies 12 to 15 minutes of running time, follows:

Film 1—Mechanism of the Human Eye; Explanation of its Function.

Film 2—Light and Vision; Physical Characteristics of Light and Factors Involved in Seeing Tasks.

Film 3—Illumination Terminology; Explanation and Definitions of Various Terms Used in Measuring Light and Illumination.

Film 4—The Quantity Requirements of Good Illumination; The Effect of Illumination Quantity upon Various Seeing Tasks and Way It is Measured.

Film 5—The Quality Requirements of Good Illumination; The Effect of Brightness, Glare, Shadows, Contrast and Color As They Affect Quality of Illumination.

Film 6—The Importance of Color in Illumination; An Explanation of Color in Terms of Pigment and Light.

Film 7—The Incandescent Lamp; Development and Characteristics of Tungsten Filament Lamps.

Film 8—Electric Discharge Lamps; For Illumination, Black Light, Sun-tanning and Bactericidal Rays.

Film 9—The Fluorescent Lamp; Basic Theory, Auxiliary Equipment and Types.

Film 10—Principles of Light Control; The Characteristics of Various Materials Used in the Control of Light.

Film 11—Systems of Light Control; The Distribution Characteristics of Lighting Equipment and the System in Which They Are Used.

Film 12—Calculation of Interior Illumination; The Steps Necessary in the Quantitative Design of Lighting Systems.

Film 13—Office Lighting; A Practical Solution to Several Typical Office Lighting Problems.

Film 14—School Lighting; An Analysis of the Problem of Incandescent Versus Fluorescent and Practical Solutions.

Film 15—Store Lighting; Illustrates the Principles Involved in General Interior Il-

lumination, Highlighting, Case Lighting, Show Windows and Visual and Luminous Fronts.

Film 16—Industrial Lighting; Illustrates the Many Factors To Be Considered by Solving Typical Problems.

Film 17—Floodlighting; Characteristics of Equipment, How To Design An Installation and Illustrations of Application.

Film 18—Cost and Maintenance of Lighting; Factors Which Must Be Taken into Account in the Design and Operation of a Lighting System from a Cost Standpoint.

The course of 18 lessons will be completed by January 15, Mr. Atwater said. Instructors will be trained at meetings to be held in late January and early February at Bloomfield, N. J., headquarters of the Lamp Division and at Cleveland, Ohio, headquarters of the Lighting Division.

For the full 18-part course, Mr. Atwater recommended that about 36 hours of classes should be allowed, or two hours for each part. He suggested that classes be held two nights each week for nine weeks, affording members opportunity to do supplementary reading and to review the material already covered.

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Westinghouse Puts Coolers on Allocation System

Despite a four-fold increase in milk cooler production this year over 1941 figures, heavy demands of dairymen for coolers has required development of an allocation program by Westinghouse officials to assure a fair and equal distribution in line with needs of respective areas, H. F. Hildreth, manager of the refrigeration specialties department at East Springfield, stated.

"The backlog of orders for milk coolers cannot be met until sometime next year despite production which has quadrupled our best pre-war years and is expanding now as rapidly as materials and tooling equipment can be found," Mr. Hildreth said.

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Sprague Electric Cited

Another "E" was added to the list of wartime awards of the Sprague Electric Co., North Adams, Mass., with revival of the Bureau of Ordnance "E" in connection with the development of the VT fuze.

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Fiske Iron Expands

The J. W. Fiske Iron Works, New York, has recently acquired all patterns from and will continue the business of manufacturing the Ornamental Metal Work and Architectural Lighting Fixtures formerly produced by the Smyser Royer Co. of York, Pa.

Dow Plans to Expand Plastics Production

A projected $15,000,000 expansion in plastics production facilties of The Dow Chemical Co., Midland, Mich., was recently outlined by Dr. Willard H. Dow, president of the company.

About two-and-one-half million dollars worth of new construction is already in progress, he said, the balance being represented by a continuing extension of facilities to be added over the period of the next five years.

"The big job the plastics industry faces today," Dr. Dow declared, "is that of producing basic plastic materials in sufficient volume that cost or supply problems will not prevent them from stepping into the jobs for which they are ideally suited. Plastics are no longer laboratory curiosities but stand today as recognized industrial materials the demand for which is already far in excess of the supply . . ."

The Dow Company hopes in five years or less to be producing at least 150 million pounds of plastic materials per year, Dr. Dow said. "This is many times our present production," he added, "and if the entire industry expands along these lines it should be of major importance in holding employment in this country at a high level."

The expansion of Dow's facilities is planned around a three-story plastics warehouse with production wings attached on either side. The original portion of the warehouse will be 240 by 320 feet and contain approximately five acres of floor space. This can be extended "almost indefinitely" and at the same time any required number of production wings added along the sides, according to the announcement.

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Woodward Governor Cited for Record on Safety

For the outstanding accident prevention record of operating for 1,311,000 man-hours without a lost time casualty the Woodward Governor Co., Rockford, Ill., has received the coveted safety flag of the Liberty Mutual Insurance Co., Boston. This is the first presentation to a Rockford organization. The company's production ranges from airplane to large prime mover governors. This organization also received the Army-Navy "E" in recognition of its important contribution to the war effort.

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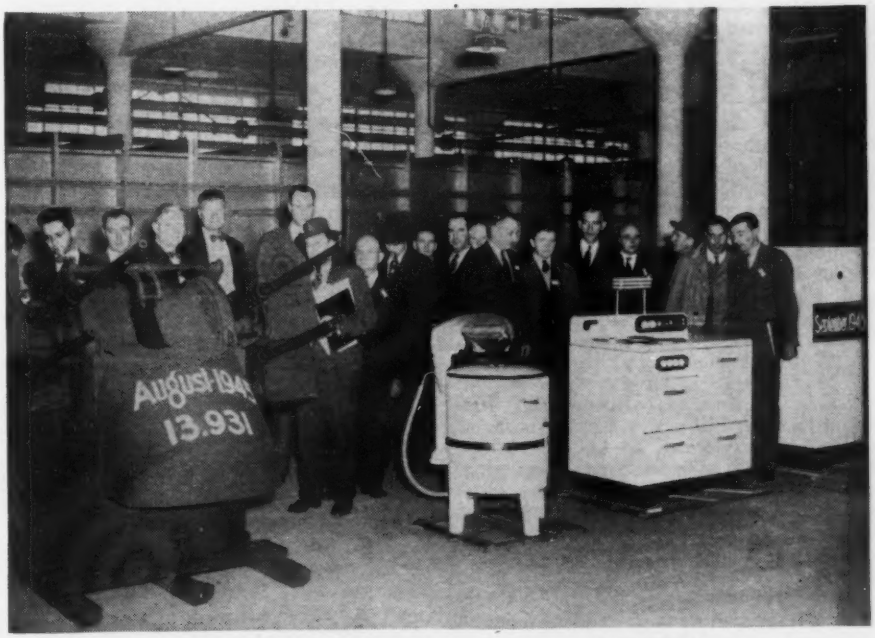
Frigidaire Adds New Line

Frigidaire Division of General Motors Corp., Dayton, Ohio, has added a complete line of refrigerated cases and fixtures to its commercial refrigeration products, E. R. Godfrey, general manager of the division, has announced. The new line will include display cases, reach-in refrigerators and walk-in coolers.



APPLIANCES REPLACE GUNS—Members of the Fourth Estate see what it's like to reconvert from war to peace as Landers, Frary & Clark opens wide the door after four years of secrecy and demonstrates how well-thought-out post-war planning is bringing about speedy reconversion. At right are electric ranges, water heaters and washing machines now coming off the production lines as the last of the 13,931 50-calibre gun mounts stands by

Field Reports on Business

Inquiries for electrical equipment are holding up, but actual sales are tapering off. Considerable interest is being shown in power generating equipment. Government buying is reported in small lots. Large-scale residential building is being planned and school structures will be a major item.

NEW ENGLAND

Sales of electrical equipment in New England are tapering off. Inquiries for equipment are holding up; interest in power generating equipment is encouraging. Public Service Co. of New Hampshire plans hydroelectric power development in the near future on Adroscoggin and Winnepesaukee Rivers.

Scattered inquiries for electric heating furnaces are reported, but there is a good deal of marking time in ordering. Ship repair yards are buying electric cables and wire for lighting installations and panel board supplies are fairly active in this field. Some Government buying is reported in small lots; electric cable, flexible cord for heaters and lamps, electric blowers, and testing apparatus are typical of this trend.

Fourteen radio receiving sets were donated last week to the Boston schools system for use in eyesight conservation class. Middlesex County (Mass.) Registry of Deeds will purchase two automatic "U" type fluorescent photo-copy machines and control panels, and Metropolitan District Water Supply Commission (Massachusetts) plans to buy conveyors for sludge handling at its Nut Island station, which will require motors and control apparatus.

Surplus war materials, including Navy type radio sets, wiring devices and small lots of flashlights are selling on retail counters. One leading Boston department store has received a shipment of Eureka vacuum cleaners, electric coffee makers, and heating pads are becoming available here. A complete sell-out in Christmas decorations is reported in many stores.

CHICAGO

Major housing projects of the Chicago Housing Authority account for a large proportion of large-scale residential building in this area. These include (1) a $5,000,000 800-home project to get under way at 27th and State Sts. as soon as all land is acquired and cleared; (2) temporary housing for war veterans, 500 already purchased and 4,500, including some trailers, requested from the National Housing Authority; and (3) a 422 home project at Wentworth Avenue and 39th St., to be finished by spring, three months behind schedule. If the Wagner-Ellender Taft National Housing Bill passes, CHA expects to embark on a program of building 5,000-10,000 housing units per year using, as a starter, $4,000,000 set aside by the state for slum-clearance in Chicago, and $5,000,000 realized from a city bond issue, earmarked for land acquisition and preparation.

Household appliances in the Seventh Federal Reserve District and in Chicago continued, during October, to show a rising rate of sales over the same month last year, while stocks of appliances dwindled markedly. The same held true during the entire period of February-October for both years, a gain of 85.3 percent being shown by sales in the district, and 170 percent for Chicago alone, during that period. Ratio of stocks sales (month's supply) for October dropped from 1.03 in 1944 to 0.48 in 1945 for the district as a whole.

Appliance manufacturers in this area are revising their 1946 production schedules downward to allow for the effect of strikes in the steel industry.

NEW YORK

Shortages of materials and skilled labor are continuing to keep production down in many lines. Uncertain labor conditions are retarding the expected upswing in industrial output.

Civil engineering construction volume in continental United States totaled $63,768,000 last week, as reported to *Engineering News-Record*. This volume was 6 percent below the volume for the preceding week, but was 215 percent greater than the volume for the corresponding week of last year. Private construction registered a 7 percent gain over the preceding week and a 743 percent increase over the corresponding week last year. The volume for public construction while 37 percent below the preceding week, was 65 percent above the 1944 week. The week's construction brought the 1945 total cumulative figure to $2,263,150,000 for the 51-week period, a 33 percent increase over the total for the similar period of 1944.

Reports indicate that retail trade during the Christmas shopping season was on an exceedingly heavy scale.

PACIFIC COAST

New price schedules on such material as fibre conduit and telephone wire all properly sanctioned by OPA reflect the general need for price increases to cover new factors since their freezing. Other schedules are designed to become effective when rail-water shipments will become available for Washington, Oregon and California thus removing them from the Rocky Mountain zone prices into which they were placed in 1940 when boats became unobtainable.

A few thousand each of Christmas tree lamps and household irons were about all each of the larger Pacific Coast cities received for the holidays. Carloads of refrigerators and ranges are regularly arriving. School and college structures promise to be a major item of 1946 construction. Richmond has voted $3,850,000 bonds to finance a group of civic structures.

Orders include a $160,946 award for 175 miles of distribution line, serving 315 members near Springer, N. M., and Bonneville will build 30 miles of transmission to connect with 320 miles of rural distribution in Klickitat County, Wash., scheduled for completion by August 1946. A San Diego firm has been awarded blanket contract covering wiring of 2,000 homes in Tia Juana, Mex., construction of a 12 kv. line from San Diego and building two substations with three 1,000 kva. transformers each. Similar service may be extended later to Ensenada and other cities.

Industrial developments include an $8,000,000 plant at Vernon, Calif., for Bethlehem Steel in early 1946; a $1,000,000 plant for California Asphalt Corp. in Willbridge, Ore.; and a $1,200,000 office and warehouse building for Brunswick Drug in Vernon, Calif.

UTILITY REPORTS

	Net Income 1945	1944
†American Gas & Electric and subs	$12,410,425	$12,070,613
*Carolina Power & Light	2,333,648	2,342,663
*Central Maine Power	3,050,734	3,247,612
‡National Power & Light and subs	4,032,546	3,882,848
†Puget Sound Power & Light and subs	4,315,190	5,195,141
*Texas Electric Service	1,951,840	1,423,541

*Twelve months ended November 30.
†Twelve months ended October 31.
‡Twelve months ended September 30.

New Explosive Rivet Iron

The Ripley Co. of Torrington, Conn., has announced the acquisition of all Goodyear rights to the low voltage riveting iron used for setting Du Pont Explosive Rivets which are widely used in blind applications and hard-to-reach places. The Ripley Co. has also completed arrangements with the explosives department of E. I. du Pont de Nemours & Co. to produce the Du Pont No. 6 riveting iron. It will be sold by du Pont for production applications.

Opens New Sales Office

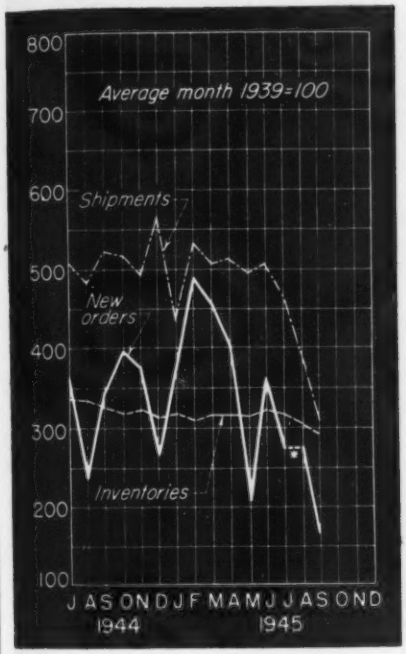
Announcement has been made by The TOCCO Induction Division of the Ohio Crankshaft Co., Cleveland, of the opening of a sales-engineering office in Indianapolis, Ind., under the direction of James W. Calloway, formerly connected with the Chicago TOCCO office. Located at 35 East Georgia St., Indianapolis 4, the new facility will broaden TOCCO's coverage of the Indiana metal working market.

New Welding Supply House

Establishment of a new welding supply house for serving users and prospective users of welding supplies in the western Michigan area has been announced by its founder, R. Dudley Layman, former district manager and welding engineer of the Grand Rapids office of the Lincoln Electric Co. Cleveland. The new company is located at 215 Oakes St., S. W., Grand Rapids, Mich. Mr. Layman, who left Lincoln Electric after 19 years of service to go into business for himself, has been replaced in Grand Rapids by I. R. Bartter, formerly district manager of the company branch at Duluth, Minn.

Orders Cancellations Drop in September

The value of new orders received by manufacturers showed a sharp upturn in September from August, increasing by 25 percent, according to the report issued by the Bureau of



ELECTRICAL MACHINERY INDICES of Bureau of Foreign and Domestic Commerce. *August orders not plotted. Cancellations exceeded orders. Orders index has been revised by Bureau from 1939 through 1944

Foreign and Domestic Commerce. The low level reached in August was due to the sharp cancellations of war orders. These cancellations slackened in September. In August both the electrical machinery and the machinery, other than electrical, industries reported cancellations exceeding new orders. But by September the indexes of the two industries had risen to 155 and 125, respectively, when the average month of 1939 equals 100.

Electrical machinery shipments index in September dropped to 311 from 398 in August; it stood at 521 in September, 1944.

The index, compiled by the Bureau, covering the value of manufacturers' inventories dropped slightly to 294.6 from 304.0 in August. It stood at 327.8 in September, 1944.

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Move New England Office

New England sales office of the National Electric Products Corp., Pittsburgh, has been moved from 137 Kneeland St., Boston 11, to 270 Albany St., Cambridge, Mass. Wallace A. Card is manager of this office.

Sales Opportunities

NEW YORK—Staten Island Edison Corp., St. George, S. I., has plans maturing for large addition to Livingston generating station, and will begin work early in 1946 on steel frame superstructure. New turbine-generator, boiler and auxiliary equipment will be installed. Gilbert Associates, Inc., Reading, Pa., is consulting engineer.

OHIO—American Home Foods, Inc., Grant Bldg., Pittsburgh, Pa., plans new processing and production plant on Eaton Rd., Hamilton. It will comprise a main one and multi-story building, with machinery and electrical equipment for large capacity. Also several auxiliary structures, including boiler plant. Cost reported close to $1,000,000. Work scheduled to begin soon. Present factory will be removed to new location when buildings are available. H. W. Roden is president.

WASHINGTON—Washington Water Power Co., Spokane, plans new power substation on tract of about 14 acres of land near city limits. Cost estimated close to $300,000, with transformers, oil circuit breakers and auxiliary equipment. Extensions will be made in transmission line for station connection, as well as in distribution system in city area.

DISTRICT OF COLUMBIA—Civil Aeronautics Administration, Commerce Bldg., Washington, will receive bids until January 10 for 125 to 168 8-kva. automatic engine-generators, and alternate bids for repeat orders on 1 to 100 similar units (Invitation 3180).

CALIFORNIA—Continental Can Co., 3820 Union Pacific St., Los Angeles, has purchased property on East 50th St., as site for new plant for paper container division. An existing two-story building, about 120,000 sq. ft. floor space, will be remodeled and improved, and new one-story structure, about same floor area, will be erected on adjoining site. Machinery and electrical equipment will be installed for large capacity. Entire project will cost about $1,600,000 and is scheduled to be carried out early in 1946. Main offices are at 100 East 42nd St., New York, N. Y.

PENNSYLVANIA—Luzerne County Gas & Electric Corp., Kingston, will begin work soon on steel frame superstructure for expansion in steam-electric generating station at Hunlock Creek, with installation of additional equipment for increased capacity. United Engineers & Constructors, Inc., 1401 Arch St., Philadelphia, is consulting engineer and will supervise construction.

GEORGIA—City Council, Americus, plans installation of motor-driven pumping machinery, controls and auxiliary equipment in connection with extensions in water system. Proposed to arrange fund of about $325,000 for this and expansion and improvements in sewage system.

ILLINOIS—Pabst Brewing Co., Inc., Peoria, plans expansion in brewery at Peoria Heights, including new seven-story brew-house, about 90 by 135 ft., and four-story adjoining building, 85 by 135 ft., for general operating service, office, laboratory, etc. Machinery and electrical equipment will be installed for large increased capacity. Cost reported close to $1,000,000. Proposed to begin work early in 1946. Harley, Ellington & Day, Stroh Bldg., Detroit, Mich., are architects.

OREGON—Frozen Foods Division, Bridgford Co., 808 Imperial Ave., San Diego, Calif., plans new plant in vicinity of Ontario. A main one and multi-story building, approximately 150 by 410 ft., will be erected for processing and general production, with several auxiliary units. Machinery and electrical equipment will be provided for large output. A quick-freeze department and cold storage plant will be installed. Entire project is reported to cost close to $1,000,000. Lyle Bartholomew, 129 North Commercial St., Salem, is architect. Work is expected to start early in 1946.

WASHINGTON—Public Utility District No. 2, Grant County, Ephrata, is having plans completed by W. B. McCrea, Jr., Perkins Bldg., Tacoma, consulting engineer, for primary and secondary lines, with power substation facilities in parts of Grant County. Cost about $950,000. Proposed to award contracts for construction of initial sections at early date.

NEW JERSEY—Public Service Electric & Gas Co., Newark, has placed contract for large tonnage of structural steel framing for proposed addition to Essex generating station, and erection is scheduled to begin early in 1946. Capacity of plant will be increased.

NEW YORK—Eastman Kodak Co., Kodak Park, Rochester, plans early construction of large multi-story addition for new color film processing plant, with installation of machinery, electrical equipment and technical facilities for heavy output. Cost reported close to $1,000,000.

PENNSYLVANIA—State Department of Property and Supplies, Harrisburg, plans power plant in connection with new penitentiary at Rockview, near Lemont, comprising a large group of one and multi-story buildings, constructed in two sections, estimated to cost about $2,500,000 and $1,500,000, respectively. Project will include a cold storage and refrigerating plant, and other utility structures. It is understood that construction will be placed under way early next year.

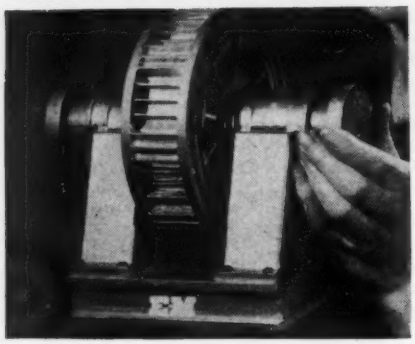
MICHIGAN—Buick Motor Co., Division of General Motors Corp., Flint, has approved plans for three-story addition, 200 by 1,365 ft., to Building No. 4 at local works, forming south section of structure. Machinery and electrical equipment will be installed for large capacity. Work on superstructure will begin at early date. An air-conditioning system will be installed. Structure is estimated to cost approximately $5,500,000. Albert Kahn Associated Architects & Engineers, Inc., New Center Bldg., Detroit, is architect and engineer.

NORTH DAKOTA—Water Dept., Fred C. Hagen, water commissioner, Fargo, plans installation of motor-driven pumping machinery, controls and auxiliary equipment in connection with expansion and modernization in waterworks station and system. Entire project will cost over $200,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

CALIFORNIA—Public Works Dept., Los Gatos, plans extensions and improvements in street-lighting system on South Main St. and Santa Cruz Ave., including installation of new units. Cost reported about $60,000. L. C. Macabee, 156 University Ave., Palo Alto, is engineer.

NEW EQUIPMENT

Adjustable-Speed Drive

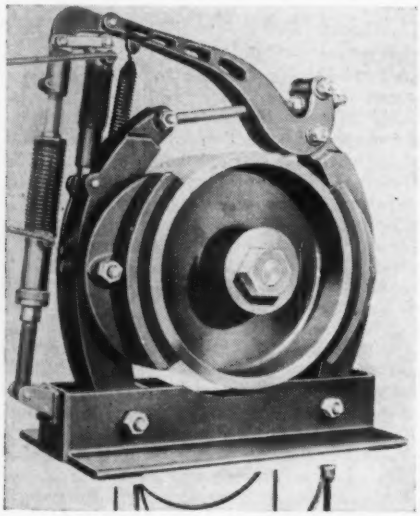


Magnetic adjustable-speed drive: ratings of 25 hp. and larger at 1,800 to 600 r.p.m. **Electric Machinery Mfg. Co.**, Minneapolis 13, Minn.

Drive is an electromagnetic torque transmitter which is used in combination with a constant speed a.c. motor and an electronic controller to provide speed control. It consists of two operating parts—a rotating ring and a rotating magnet. It was developed for quick-response speed control of boiler draft fans, centrifugal pumps, blowers and compressors.

•

Control Unit

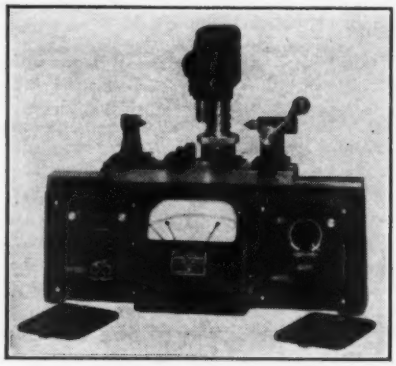


Brake control unit. **Wagner Electric Co.**, 6456 Plymouth Ave., St. Louis 14, Mo.

Brake control unit which was developed for use with the company's type BM crane-bridge brake is reported to provide automatic "cushioned" emergency stops when power fails or the crane runs beyond safe limits on the runway. The control permits free use of the foot-controlled hydraulic brake for service stops while at the same time it holds the parking-brake setting-spring compressed and ready to apply the break in an emergency. The "cushioned-stop" valve is used to apply the break at a predetermined rate. Brake is automatically applied when main line switch is opened but may be released by the operator depressing the foot pedal.

•

Comparator



Scanning surface comparator; carriage has 7-in. travel and 6-in. cylindrical capacity. **Comtor Co.**, Waltham, Mass.

Unit consists of a photoelectric scanning head, a self contained amplifier with calibrating controls, a finish meter with tolerance markers, and a ball bearing work holding carriage. The finish meter is graduated so that readings represent the smoothness of the surface inspected as a percentage of the smoothness of the standard.

•

Tube

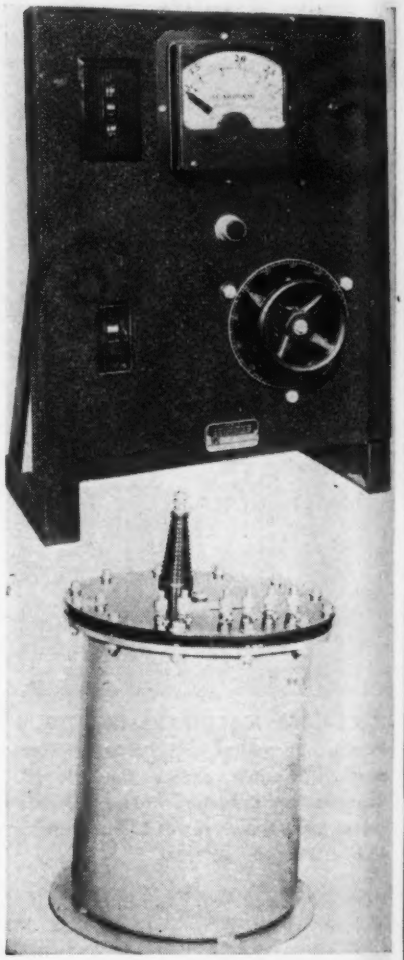
Type "3D23" high frequency tetrode: up to 250 mc.; max. power output, 130 watts. **Lewis Electronics**, Los Gatos, Calif.

The tube, because of its top plate construction and its ceramic base, is reported to have low inter-electrode capacities. Operation is possible up to 250 mc. with full power input and up to 400 with half power input. Maximum power output is given as 130 watts (35 watts plate dissipation). The tube may be used as a power amplifier in certain types of installations, and also as an oscillator or amplifier doubler.

BUYING ELECTRICAL EQUIPMENT?—McGraw-Hill's *Electrical Buyers Reference* is a convenient place to look first for manufacturers' product data, names and addresses.

•

Test Set

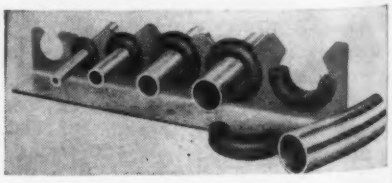


Stationary test set; operates from 115-volt, 60-cycle supply; test voltages up to 15,000; cap. 2 kva. **General Electric Co.**, Schenectady 5, N. Y.

Set consists of an oil-insulated step-up transformer and a separate vertical-type control panel. Overall dimensions are 23x 18x25 in. Included is a variable voltage autotransformer for control of output voltage, a double scale switchboard-type voltmeter, a voltmeter-scale selector switch, an air circuit breaker with instantaneous overload trip, and a red signal lamp.

•

Fairleads



Fairlead for electrical and other types of conduit. **Double T. Fairlead Co.**, 301 Acadia Ave., Hawthorne, Calif.

Fairlead is composed of two parts—support and grommet. They are designed to support lines of tubing of the same size or any combination of sizes. Assembly is made easy by the split grommet.

Weatherproof LASTS!...and LASTS!!...and LASTS...!!!

FOR CONTINUITY OF SERVICE ...ANACONDA TRIPLE BRAID and DURALINE URC

Thorough research—strict manufacturing and testing procedure—these are reasons for the long life of Anaconda URC. No coming apart—no festooning. Be *sure* of maintenance-free service—*specify Anaconda URC Weatherproof.*

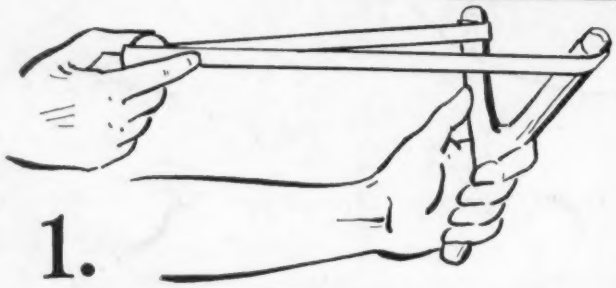
45323

LOOK TO ANACONDA *Anaconda* FOR WEATHERPROOF THAT LASTS!

Plain Facts on The "Quick-Break" Principle

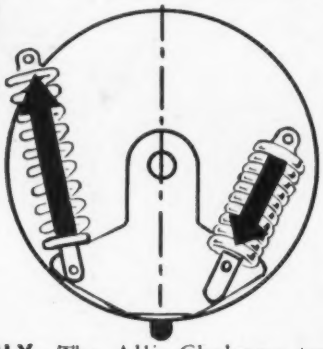
HERE'S WHAT IT IS — HERE'S HOW IT GIVES YOU CLOSER REGULATION AT LESS COST WITH ALLIS-CHALMERS 5/8% STEP REGULATORS

ENERGY STORED-UP



1.

A SLINGSHOT is a familiar example of the principle of storing energy for "Quick-Break" application. As the rubber band is pulled back, energy is being built up which can be suddenly released.



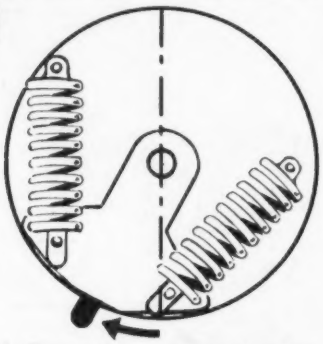
2.

SIMILARLY, The Allis-Chalmers tap-changing mechanism applies the "Quick-Break" principle, by gradually storing up energy for a quick tap change, in a pair of *balanced* driving springs.

"QUICK-BREAK" RELEASE

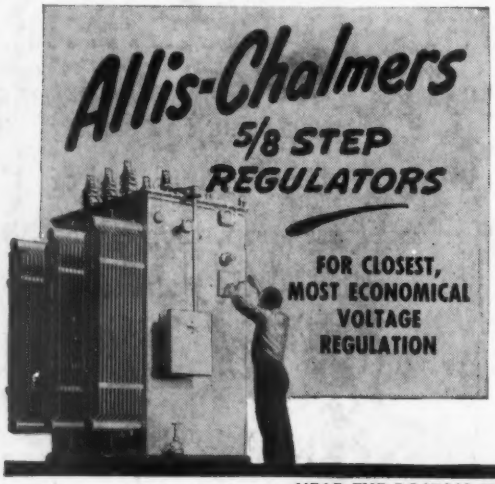
3.

UPON RELEASE of the slingshot, the stored energy in the rubber band is instantly applied to the stone, propelling it forward. This "Quick-Break" energy application is just the opposite of slow-breaking application of energy as it is generated.



4.

IN THE A-C tap-changing mechanism, quick release of built-up spring energy separates contacts with a *snap action,* in contrast to slow-breaking types of mechanism. Since the arc exists for only a *brief instant,* arcing doesn't burn or pit contacts.



"QUICK-BREAK" PRINCIPLE MEANS LOW MAINTENANCE, EXCEPTIONALLY LONG CONTACT LIFE

WITH ARCING reduced to a minimum by "Quick-Break" contact separation, contacts on Allis-Chalmers 5/8% Step Regulators may be expected to last as long as the regulator is in use. As a matter of record, no current-carrying contact has ever been replaced on an Allis-Chalmers 5/8% Step Regulator, due to deterioration in normal service.

OTHER LOW MAINTENANCE PRINCIPLES: 1) Unit construction of A-C 5/8% Step Regulators, eliminates 78 bolted connections; 2) Oil immersion of all moving parts keeps parts dust-free, eliminates need for lubrication; 3) Feather-Touch control, with voltage integration, eliminates holding coils, sealing-in switches.

Get the full story on economical 5/8% Step Regulators for all voltages by writing for Bulletins B6056A and B6065, ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 1931

HEAR THE BOSTON SYM[illegible]ONY: *Every Saturday Evening, American Broadcasting Co.*

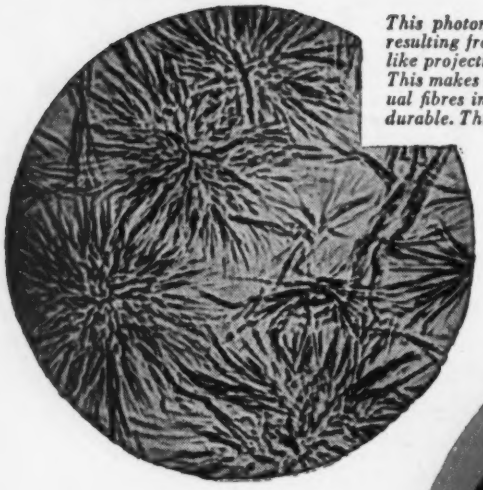
TOOLS

From pliers to pike poles — clamps to cable cars — tree trimmers to tamping bars, Graybar offers first-quality tools for every power line job. These tools are designed specifically to help linemen do the best work with the greatest safety. Special tools are available for hot-line jobs.

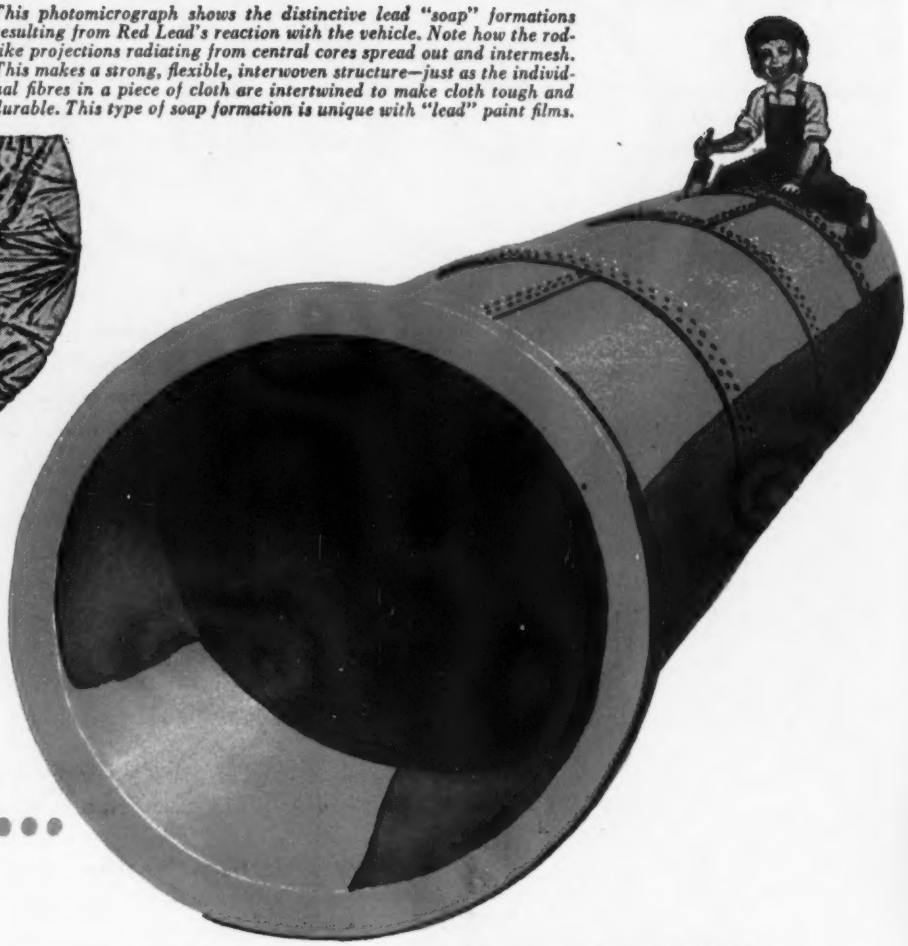
By making Graybar your headquarters not only for tools — but for hardware, poles, crossarms, strand, insulators, pins, and accessories — you will always be sure of getting the right materials for each job. *Graybar Electric Company, Graybar Building, New York 17. N. Y.* 4835

Via GraybaR
First Source of Pole-Line Supplies

IN OVER 80 PRINCIPAL CITIES



This photomicrograph shows the distinctive lead "soap" formations resulting from Red Lead's reaction with the vehicle. Note how the rod-like projections radiating from central cores spread out and intermesh. This makes a strong, flexible, interwoven structure—just as the individual fibres in a piece of cloth are intertwined to make cloth tough and durable. This type of soap formation is unique with "lead" paint films.



unique LEAD SOAPS...

another important reason why RED LEAD means Extra Rust Protection

Why is Red Lead outstanding as a metal protector?

One of the major reasons is this pigment's remarkable ability to impart to the paint film strong, tough, intertwining lead "soap" formations—as shown in the photomicrograph above.

These unique lead "soaps" improve the paint film in many ways. For one thing, they form a dense, intermeshing matrix which restricts the passage of water through the film. And rusting does not take place without the presence of moisture.

For another, they *mechanically* reinforce the film, giving it extra *strength* and *toughness.*

And again, Red Lead "soaps" contribute all-important *elasticity*—allowing movement along their intermeshing projections. This action helps prevent the ruptures to which a hard, unyielding film is subject. Moreover, when a paint film dries and ages, decomposition of the vehicle sets in. But, because of Red Lead's ability to combine with the decomposition products and form soaps, it increases both the durability of the paint film and its adhesion to the base metal.

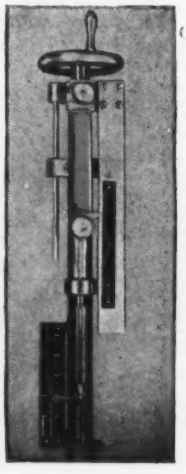
Red Lead's extra strength, toughness and elasticity are demonstrated by the tensile strength test below and substantiated by exhaustive research and field service.

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including phenolic and alkyd resin types.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint.

* * *



In this tensile strength tester a typical Red Lead paint film has been stretched 18% without breaking. In withstanding this elongation it has maintained a load of 920 grams. Any film that exhibits these characteristics has unusual strength, toughness and elasticity. As metals expand and contract only a fraction of one percent, this film would adhere under the most extreme conditions.

No matter what price you pay, you'll get a better paint for surface protection of metal, if it contains Red Lead.

Write for New Booklet—"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas—ranging from Red Lead-Linseed Oil paints to Red Lead-Mixed Pigment-Varnish types. If you haven't received your copy, address nearest branch listed below.

* * *

All types of metal protective paints are constantly being tested at National Lead's many proving grounds. The benefit of our extensive experience with Red Lead paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston, W. Va. (Evans Lead Division).

DUTCH BOY RED LEAD

DISCONNECTING SWITCHES

CHECK the FACTS

1. CONTACTS — HI-PRESSURE, self-cleaning introduced in 1925 as the most effective means to make-and-break contact. The critical point of a switch. Only one contact is necessary — only one is used. Demanded by switch users — today a standard principle.

2. BLADE OPERATING MECHANISM — a positive, simple blade control, requiring minimum operating effort. Continuous lever motion lowers or lifts blade, and blade rotates only at fully closed position.

3. BLADE HINGE — A simple, mechanical blade bearing with no attachments. Electrical contact made with flexible braids that are engineered for the blade requirements. Flexes properly prepared for weather and corrosion — properly engineered for duty required and properly applied to blade motion.

4. TERMINAL — Integral with switch parts. Standard four-bolt, clamp type, with 1¾" drilling.

5. BEARING — Weather sealed, anti-friction, greaseless — reduces operating effort.

WIRE GUIDE — Outrigger mounting holes.

Type **TTR**

R&IE the SWITCHING EQUIPMENT *Specialist*

The Check List

CONDUCTOR SUPPORTS, CLAMPS AND FITTINGS

DISCONNECTING SWITCHES
INDOOR AND OUTDOOR

HORN GAP SWITCHES

INTERRUPTER SWITCHES

CUTOUTS AND THERMO-RUPTERS

SWITCH OPERATING MECHANISMS

SUBSTATIONS

OPEN OR ENCLOSED, ISOLATED PHASE HEAVY DUTY BUSES

KIRK INTERLOCK SYSTEMS

AUTOMATIC SECTIONALIZING EQUIPMENT

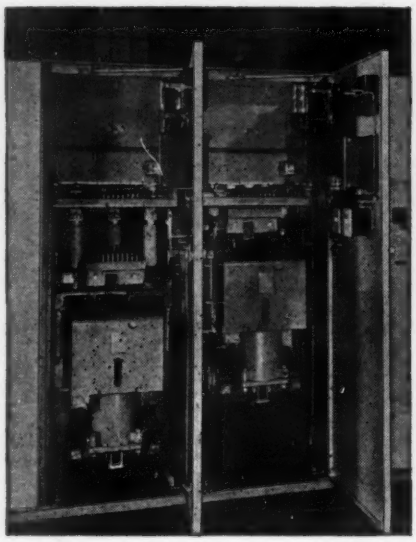
METAL CUBICLES

TESTING DEVICES

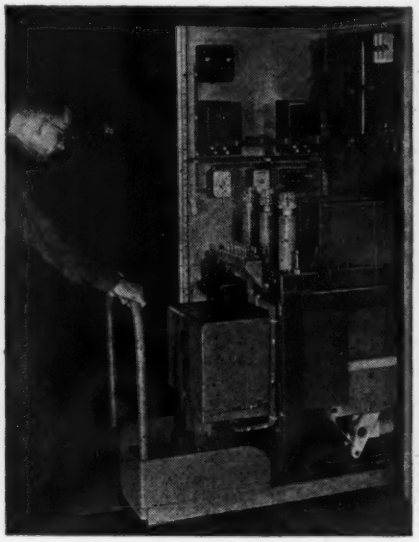
RAILWAY AND INDUSTRIAL ENGINEERING CO., GREENSBURG, PA.
BRANCH IN CANADA — EASTERN POWER DEVICES, LIMITED, TORONTO

See How Easy it Is to

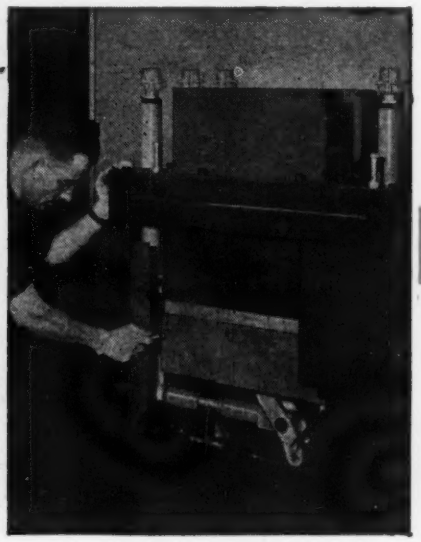
ROUTINE CONTACT INSPECTION IN 3 QUICK STEPS ON OILLESS "RUPTAIR" MAGNETIC AIR BREAKER



1 LOWER BREAKER. Photo shows "Ruptair" magnetic air breaker in operating position (at right) and in the lowered disconnect position. The breaker is easily lowered with manually or electrically operated crank-hoist.



2 WITHDRAW BREAKER. In disconnect position, the "Ruptair" breaker can be placed on a transfer truck, and pulled out into the aisle. For safety, shutters to isolate disconnect contacts are automatic in operation.



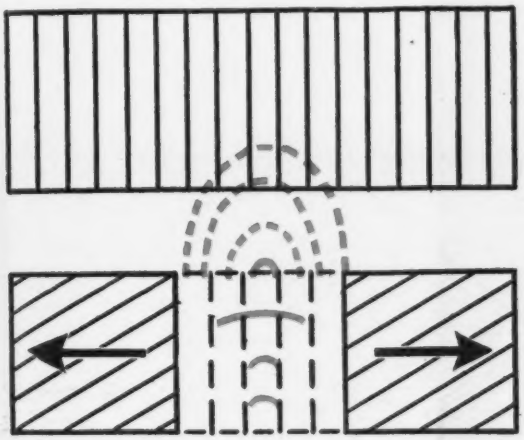
3 REMOVE SIDE PLATES. Finally, light-weight insulating barriers are removed, each barrier being held in place by two cap-screws. Since the arc chute is above the contacts, it need not be disturbed for contact inspection.

AS A MODERATE capacity, oilless circuit interrupter, the "Ruptair" breaker is gaining increased popularity among operators. Elimination of oil means many more repetitive operations without maintenance . . . reduced fire hazard . . . less danger from breaker failure.

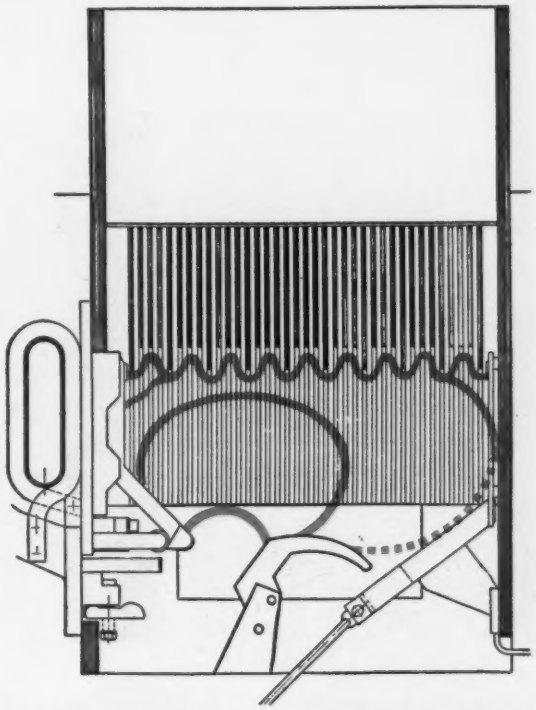
In addition to these advantages, and simplest inspection of any magnetic air breaker, the "Ruptair" breaker combines space saving vertical lift construction with horizontal contact separation, shown at top of opposite page. "Ruptair" circuit breakers are built in standard ratings of 5 kv and below, 150,000 kva interrupting capacity and below, for installation in metalclad switchgear, cells, or cubicles. To get the full story, write Allis-Chalmers, Milwaukee 1, Wis.

Inspect A "RUPTAIR" MAGNETIC AIR CIRCUIT BREAKER

WITH HORIZONTAL SEPARATION OF BREAKER CONTACTS, MAINTENANCE AND OPERATION ARE SIMPLIFIED



SINCE THE ARCING contacts on a "Ruptair" magnetic air circuit breaker are separated in the horizontal direction, natural thermal effect assists the arc into the arc chute . . . no complex interrupting structure is required! Position of arc chute *above* contacts makes it possible to inspect contacts without removing the chute. Maximum interrupting effectiveness is achieved in the "Ruptair" circuit breaker, without departing from ideal simplicity of design.



RUPTAIR BREAKER HAS UNIQUE DESIGN

THE RUPTAIR breaker depends for its high efficiency throughout interrupting current range on several design factors . . . coordination of horn-shaped moving contact and arc runner for quick transferral of the arc . . . establishment of a strong magnetic field in the breaker before actual contact separation . . . and special design of the arc chute.

Why Allis-Chalmers offers all 3 types of Circuit Breakers

☛Ever hear of "special theater modifications"? That's a military term, and refers to the adaptation of aircraft to unusual flying conditions, such as are encountered in Central Alaska, or in torrid tropical climates.

☛An airplane built for special theater operations often differs in practically every detail from a plane designed for duty under normal atmospheric conditions. That is, the Army and Navy have learned that *one* type of plane can't function in *all* theaters of war!

☛*For the same reasons, Allis-Chalmers engineers know that one type of circuit breaker won't do the job in all the varied environments encountered in industry.*

☛Therefore, it is an Allis-Chalmers switchgear policy to offer *all three* basic types of circuit interruptors — oil, magnetic air, and air blast breakers — for unrestricted customer choice. Neither by price penalties, or any other means, does Allis-Chalmers seek to coerce buyers into selecting any *one* type of breaker.

☛Thus the customer has a means of expressing his circuit breaker preference, based on intimate knowledge of local operating conditions. And indirectly, through the medium of free choice, he influences the future trend of switchgear development. A 1863

A-C ALLIS-CHALMERS
MILWAUKEE

A GOOD PINTYPE INSULATOR

Must be there When it's Over

MOST of the time, a pintype insulator deals with not more than five or ten thousand volts, and does it very easily. But what happens when the skys open up and hit it with millions of volts and perhaps a hundred thousand amperes? This is the test of a pintype insulator--to survive lightning strokes, and *be there when it's over!*

It takes the best of design to resist puncture and divert a steep wave front to flashover. It takes the best of materials to back up that design. Pintypes lead the hardest life of any power insulator due to their exposure hazard and, because of their small size, they have to be tough.

Furthermore, pintype lines represent the power company in the public eye. These lines bring your product--power--direct to the man who pays the bill. The performance of such lines plays a vital part in good public relations.

The user of pintype insulators can no more afford to ignore their importance than their maker. O-B makes them right for the man who realizes how good they must be.

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS COMPANY, LIMITED,
NIAGARA FALLS, ONTARIO

2616-H

If You're Asking These Questions About
RECONVERSION INVENTORY

What do we do first?
How can we tell if the units okay?
Where do we begin?
Who should handle the job?
What do we need to start?
How can we keep our parts stock small?
Can we tell in advance where trouble will be?
What are the tolerances?

...Get This Helpful Kit FREE!

Covers all makes of motors, pumps, and v-belt drives

As you reconvert to peacetime production—competitive production in which every unit *must* operate at top efficiency—you'll have to know what present equipment you can use. You'll want to weed out wartime makeshifts, match the right unit to each job. You'll need to take inventory. Allis-Chalmers' free Reconversion Inventory Kit—covering all makes of electric motors, centrifugal pumps, and v-belt drives—will speed this work. It outlines entire procedure, states standards and formulae, includes simple check list appraisal charts. Call your A-C distributor or district office, or mail the coupon to Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

ALLIS CHALMERS

HEAR THE BOSTON SYMPHONY: *Saturday, American Broadcasting Co.*

A 1945

ALLIS-CHALMERS, Dept. 00
Milwaukee 1, Wis.

Send us the free Reconversion Inventory Kit covering motors, centrifugal pumps, and v-belt drives.

Company Name.....

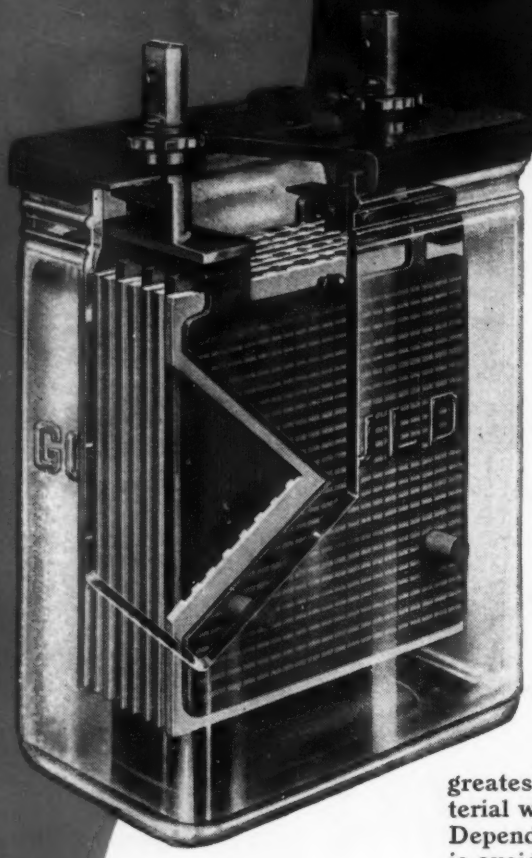
Address.....

.....

Attn. of Mr......

Why do ENGINEERS say

Planté is the BEST

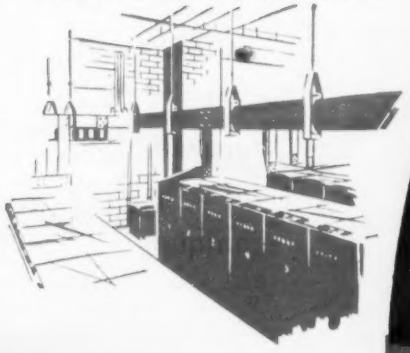


1. One-piece, pure lead positives provide full plate performance throughout battery life.
2. One-piece, pure lead positives insure highest discharge rates for unfailing operation of electrical equipment.
3. Current output of one-piece, pure lead positives averages more than 23% above that of equivalent batteries.
4. One-piece, pure lead positives without holding structures provide longest possible life. They prevent partial deterioration that results in loss of capacity.
5. A dense film of active material covers entire plate area. This prevents peroxidization and disintegration, both of which result in lowered current output and shortened battery life.
6. One-piece, pure lead positives give greatest conductivity. This is due to an active material which is an integral part of the plate itself. Dependence upon mechanical electrical contact is avoided.

...BEST FOR TELEPHONE SERVICE

In floating operations common to telephone installations, the Gould Plante is unusually free from electrical troubles. It has a service life expectancy of 14 years and many installations have been in use for twice that time and longer.

Gould also builds two other types of stationary batteries, Kathanode and Dreadnaught. Write Dept. 1812 for Catalog 1000 on Gould Sealed-in-Glass Batteries for Stationary Applications.



GOULD

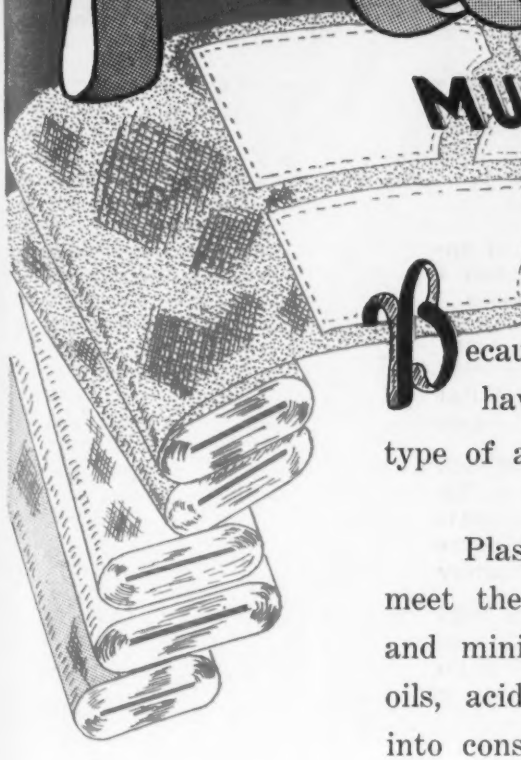
Planté

PURE LEAD FOR LONGEST LIFE

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y. Factories: Atlanta • Boston • Chicago • Dallas • Depew Leavenworth • Los Angeles • North Bergen • Rock Island • Saint Paul • Salem • Sioux City • Zanesville

Plastics

MUST BE TAILOR-MADE



Because plastics have such a wide appeal, many people have come to think of them as a cure-all for every type of application. This is a misconception.

Plastic insulation, like rubber, must be compounded to meet the specific problems of the job in hand. Maximum and minimum temperatures, vibration, presence of certain oils, acids, alkalies, and other factors, all must be taken into consideration.

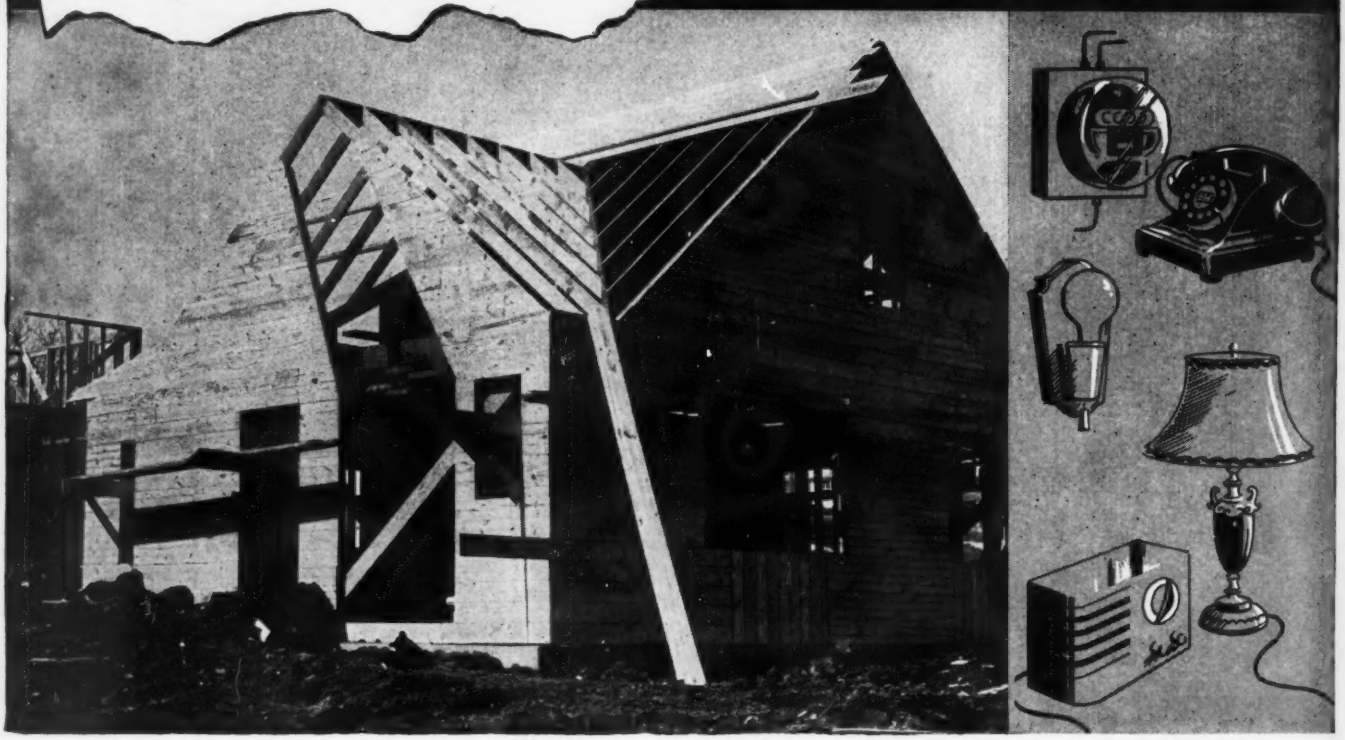
Simplex-PLASTEX insulated wires and cables are all engineered for the job they are to do. When you need plastic insulated wire and cable, come to the headquarters for advanced research both in raw materials and manufacturing technique, — come to Simplex.

Simplex — WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

What types of wire insulated with Geon should be used in this home?

T HOUSE WIRE
TW HOUSE WIRE
UNDERGROUND SERVICE ENTRANCE CABLE
APPLIANCE CORD
LAMP CORD
FIXTURE WIRE
RADIO WIRE
TELEPHONE WIRE



THE coming construction boom will bring with it a boom in the use of wire and cable insulation made from GEON polyvinyl materials. That's because GEON is being used as insulating material for *all* types of domestic wiring with the exception of cord for certain types of heating units such as toasters, roasters, irons or home heaters. And there's reason to believe that these applications may soon be on the list.

The versatility of insulation made from GEON is graphically demonstrated by its use for underground power cable on the one hand and as "spaghetti" for fine radio wire on the other.

The use of wire insulation made from GEON will bring with it many advantages in addition to GEON's excellent electrical properties. Ease of installation, for example, is one; and resistance to water, chemicals, air, aging, ozone, abrasion, heat, cold and many other normally destructive factors. Insulation made from GEON may be colored in the entire NEMA range.

Specify insulation made from GEON when you order from your manufacturer or wholesaler. Or, for information regarding special applications, write Department CC-13, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

Call in T&B "SOLUTIONEERS"

ORDINARILY, the several hundred thousand T&B types, styles, sizes and finishes of Approved fittings for wire, cable and raceway answer the most exacting electrical requirements.

Yet hardly a week passes without calls upon our Engineering and Development Departments to devise ingenious solutions for unusual or difficult wire and cable problems. This "solutioneering" work includes the invention of tailor-made fittings, often revolutionary in design—but always with the safety factor in mind.

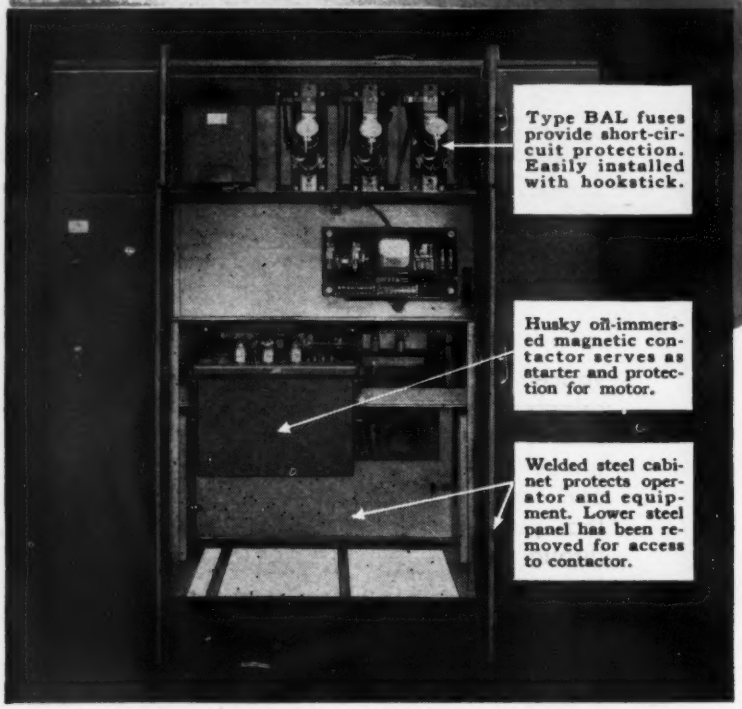
We invite you to use this free T&B service. Requests may be made through T&B Electrical Supply Wholesalers, our sole distributors, or to our District Offices in leading cities, or to the factory.

THE THOMAS & BETTS CO
INCORPORATED
manufacturers of electrical fittings since 1898
ELIZABETH, N. J., NEW JERSEY
In Canada: Thomas & Betts Ltd., Montreal

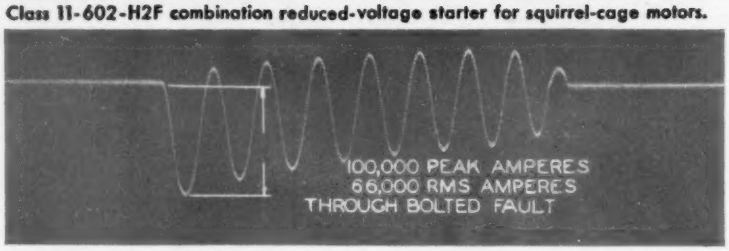
HERE'S

high interrupting capacity

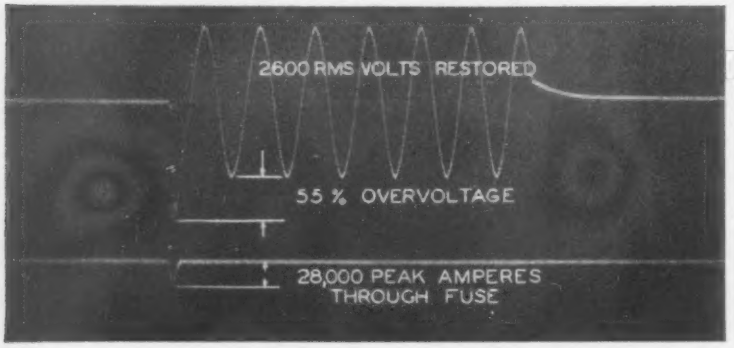
FOR HIGH VOLTAGE MOTOR CIRCUITS


Type BAL fuses provide short-circuit protection. Easily installed with hookstick.
Husky oil-immersed magnetic contactor serves as starter and protection for motor.
Welded steel cabinet protects operator and equipment. Lower steel panel has been removed for access to contactor.

Class 11-602-H2F combination reduced-voltage starter for squirrel-cage motors.



These oscillograms show the ability of the Type BAL fuse to limit current in .002 seconds and rupture it completely within ½ cycle. Upper oscillogram shows peak current of 100,000 amperes through bolted fault. Lower oscillogram, made under identical conditions, except with the Type BAL fuse in circuit, shows a peak current of 28,000 amperes. Note, also, that recovery voltage was limited to 155% of the peak circuit voltage.



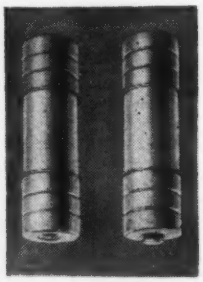
Westinghouse Combination Starters combine in a single unit *high interrupting capacity* with complete protection for the motor *and* personnel.

Quick acting Type BAL fuses limit available fault current to a fraction of normal value and provide positive protection under short circuit conditions. They also act as disconnects to isolate the starter from the line, for maintenance or other servicing operations. Type BAL fuses are replaced or installed with a simple hookstick—no special tools are required. Interrupting ratings: 2300 volts, 150,000 kva; 4160 volts, 250,000 kva.

The Westinghouse Type DN-OH oil-immersed contactor with thermal overload relay provides motor protection. The sturdy magnetic contactor is built to withstand the most severe and frequent starting duty.

A welded steel cabinet safeguards personnel. The separate compartments for fuses, contactors and low-voltage control provide maximum safety for operators.

For complete details, write for bulletin B-3467. Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-60616



Easy-to-see indicator (right) spots blown BAL fuse quickly.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Combination Starters

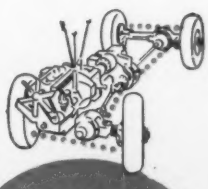
FWDs ARE RUGGED *Dependable* PRIME MOVERS

In everyday duty for utilities, FWDs regularly do 61 jobs. Including special jobs, there are more . . . write for list. For all year 'round utility truck work, you can always depend on FWDs.

FWD trucks . . . rugged, reliable, modern . . . embody the highest development of the original four-wheel-drive principle, pioneered and advanced by FWD since 1910. The true FWD principle with center differential and properly balanced power on all wheels, gives these trucks outstanding mechanical advantages and performance leadership . . . the FWD principle that provides the power and stamina to get through . . . regardless of weather, road conditions or lack of roads . . . with greater assurance and safety. Balanced weight distribution on all four wheels conserves precious tires, replacements, oil and gas. As leaders in performance, economy and style, FWDs are a great "buy" for utilities. Their value is so widely recognized that they are used by over 200 utilities, many of which operate large FWD fleets.

THE FOUR WHEEL DRIVE AUTO COMPANY, Clintonville, Wisconsin

Canadian Factory: Kitchener, Ontario

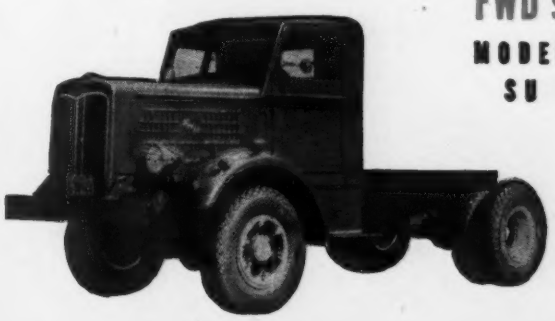


FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

More than $75,000,000 in purchases of FWD Model SU alone in the comparatively short span of forty-eight months, emphasizes FWD leadership in this field!

FWD's MODEL SU

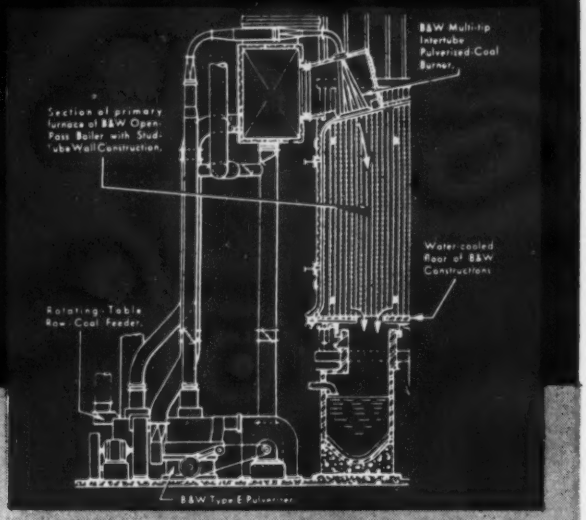


CUT STEAM COSTS with B&W COMPONENT EQUIPMENT

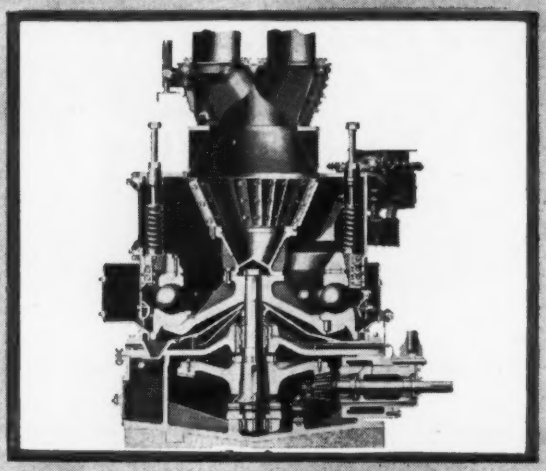
The various component equipment shown on these pages accounts to a large degree for the high standards of dependability, availability, efficiency and flexibility which have characterized the performance of B&W Boilers for over 60 years wherever steam is used.

Because B&W builds boiler units with all essential components—from fuel-preparation and burning equipment to breechings and stacks—the company has full control over both design and application of complete equipment. All component features are thus coordinated to assure maximum dependability and economy of operation under the service conditions of each specific installation.

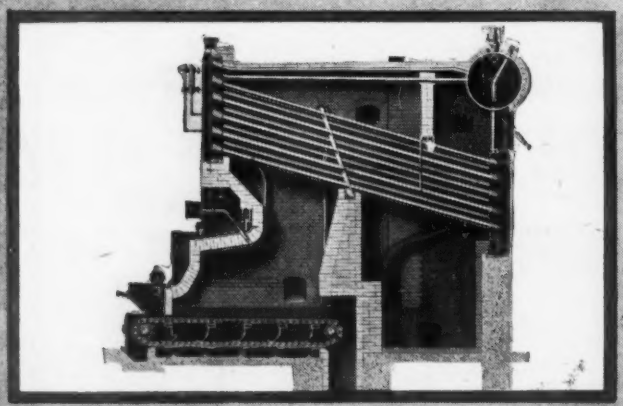
Many of the B&W component features shown can be applied to modernizing existing boiler plants to step up efficiency and reduce steam costs. These are good reasons why it pays to see B&W first on any steam generating requirement.


B&W Multi-tip Intertube Pulverized-Coal Burner.
Section of primary furnace of B&W Open-Pass Boiler with Stud-Tube Wall Construction.
Water-cooled Roof of B&W Construction.
Rotating-Table Raw-Coal Feeder.
B&W Type E Pulverizer.

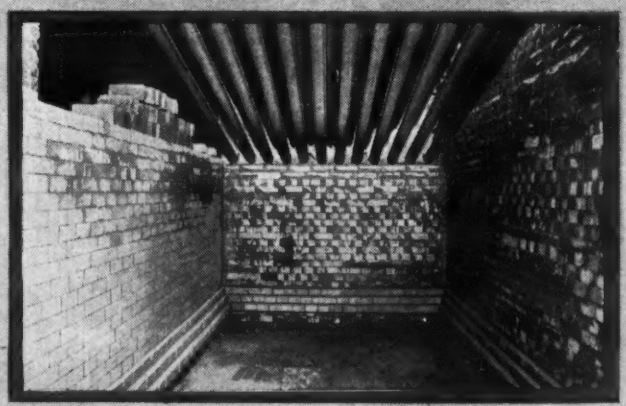
B&W DIRECT-FIRING PULVERIZED-COAL SYSTEM. B&W direct-firing pulverized-coal system has advantages in ease of operation, reliability and upkeep that make it economical for small as well as large boilers. It is readily applied to oil-fired boilers for conversion to coal firing.



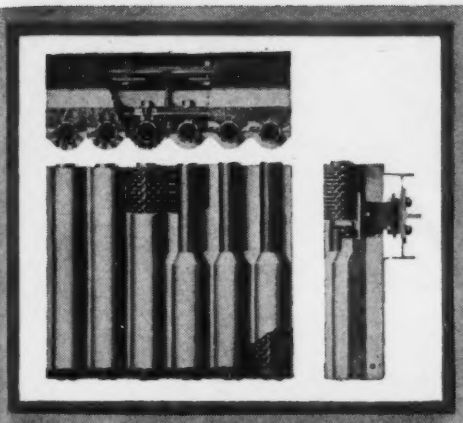
B&W PULVERIZERS. The simplicity and sturdiness of B&W ball-bearing type pulverizers assure high availability with low maintenance in direct-firing pulverized-coal systems. They provide consistently high fineness and respond quickly to changes in load with automatic control of raw-coal feed.



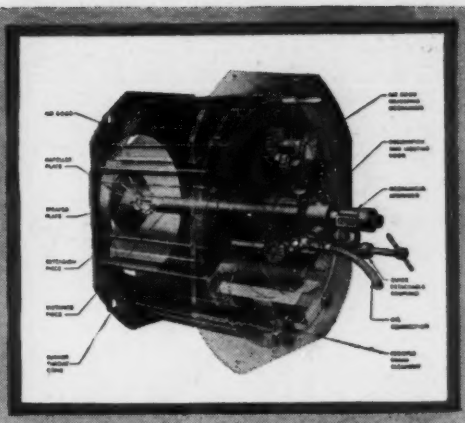
CHAIN-GRATE STOKERS. Babcock & Wilcox Chain-Grate Stokers are widely used with free-burning bitumineous coal, anthracite, lignite, and coke breeze. They can be furnished for natural, induced, or forced draft, depending upon operating conditions.



REFRACTORIES. Low heat conductivity, long service life, high hot-load strength, high resistance to spalling, structural stability and light weight are features of B&W specialty refractories that assure low maintenance, fuel economy and efficient furnace operation.

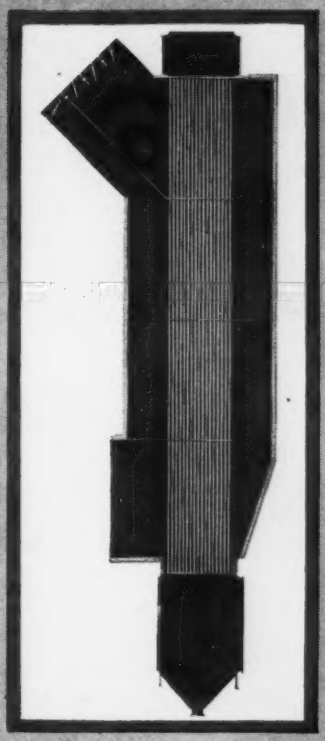


WATER-COOLED FURNACE CONSTRUCTIONS. B&W Water-Cooled Furnace Constructions are extensively applied for partial or complete water cooling of furnaces of all sizes, shapes, and forms, and with all fuels and combustion methods. Studded-tube type of construction is shown.

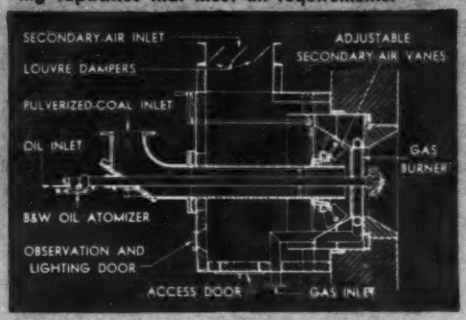


OIL BURNERS. B&W Oil Burners effect rapid and complete combustion at all rates of fuel feed, using mechanical, steam, or steam-mechanical atomizers, depending on the oil and operating conditions. Available in a range of heat liberating capacities that meet all requirements.

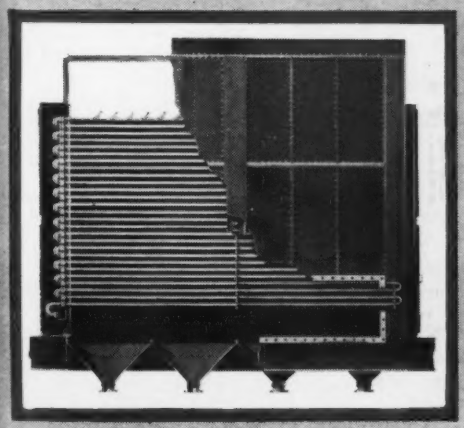
CYCLONE STEAM SEPARATOR. Elimination of solids and moisture from steam in boiler drums, and promotion of boiler water circulation by mechanical means are accomplished with a high degree of effectiveness by the Cyclone Steam Separator.



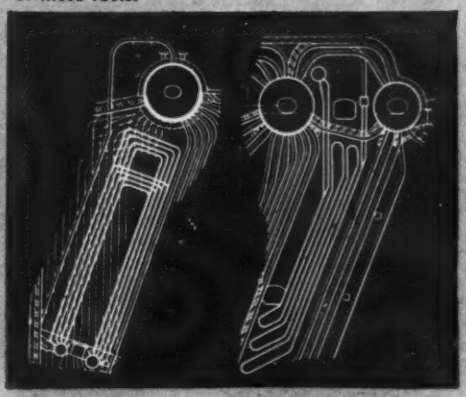
AIR HEATERS. B&W Tubular Air Heaters are inherently tight and efficient, and are easy to keep clean. Available in multi-pass gas flow type, as shown, or longitudinal gas-flow type, and in sizes to meet the requirements of any boiler installation.



MULTIFUEL CIRCULAR BURNER. Pulverized solid fuels, oil, and gas are burned singly or in any combination with this burner. It provides a single means of efficiently burning a wide range of fuels, permitting advantage to be taken of variations in the availability and market prices of these fuels.



ECONOMIZERS. B&W Economizers effect appreciable savings in fuel and can be built to meet the size and pressure requirements of any installation. The Return-Bend Economizer shown can be easily cleaned, and pressure parts may be inspected externally while in service.



SUPERHEATERS. B&W Superheaters are properly designed and fabricated, with respect to steam and gas flow, to function efficiently with boilers designed and built by B&W. Available in both draining and non-draining types

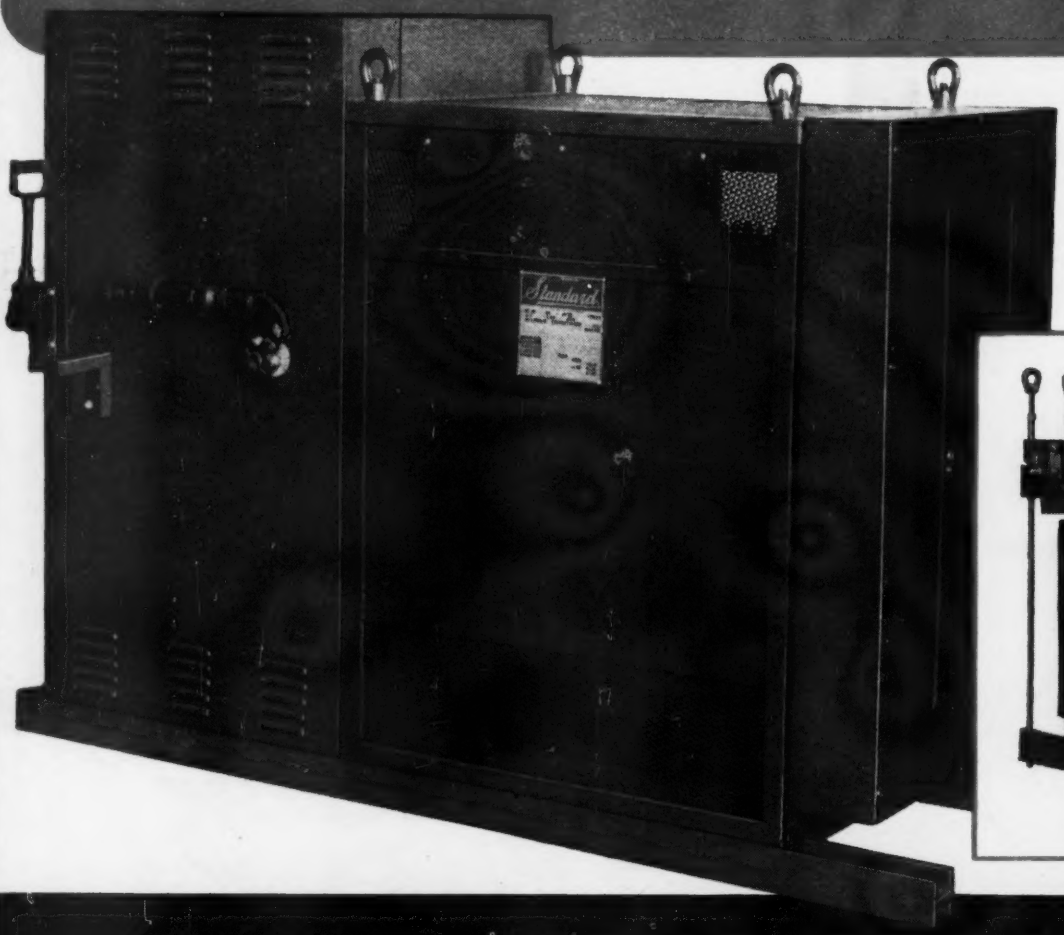
Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
85 LIBERTY STREET, NEW YORK 6, N.Y.

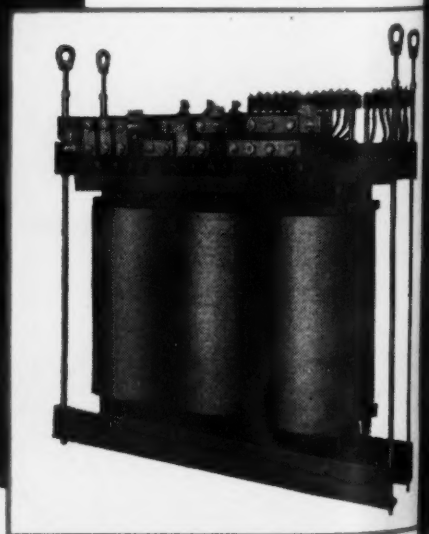
G-315F

WHY Standard TRADE MARK DRY TYPE TRANSFORMERS *save money and manhours* FOR YOU



Unit substation, consisting of attached high voltage disconnect switch and fuses, low voltage enclosed circuit breaker panel and dry type air cooled 600 KVA transformer. H-beam base construction permits portability. Suitable for platform mounting in large industrial building.

Core and coil structure of this di... insulated (for 80°C temperature... transformer. STANDARD makes use of the newest in transform... sulating materials.

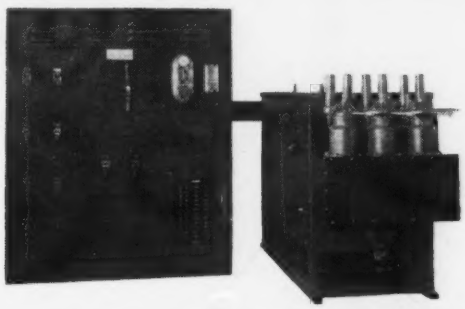


For Every Class of Service **THE STANDARD T...**

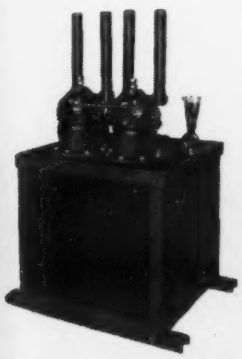
Makers of: POWER, DISTRIBUTION, RURAL, INSTRUMENT, STREET ... LIG...

stalled at Power Load Centers

. Dry Type, air cooled transformers, combined with pro-ctive equipment, result in economy and efficiency for door distribution systems. Specialization in transformer sign coupled with 25 years' experience make STANDARD dependable source for consultation as well as transformer oduction. Here's how you'll benefit by specifying TANDARD dry type load center units:

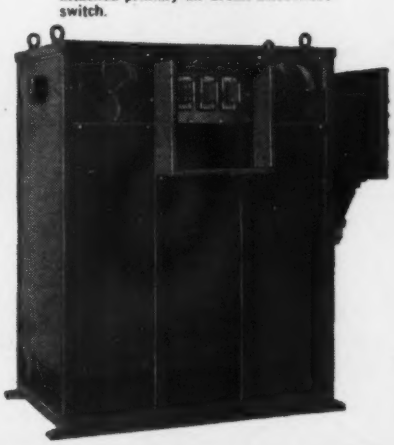


Dry type, air cooled transformer, with attached primary oil fuse load break disconnect switch. Connection to low voltage switch board by means of throat and bus duct.



Twenty-five KVA, single phase, 2400 volt air cooled unit with attached oil fuse disconnects, arranged for platform mounting.

500 KVA unit equipped with thermostatically controlled fans for accelerated air cooling. Note enclosed secondary bus-bar type terminals and attached primary air break disconnect switch.



1. save **MATERIALS**... less copper less stee by locating at load center.

2. save **LABOR**... order transformers with switches, breakers or fuses combined in one unit.

3. save **SPACE**... easily installed above the floor or in out-of-the-way locations to conserve floor space. No fireproof vaults needed.

4. save **ON MAINTENANCE**... no liquids to test or filter on dry type transformers.

5. save **ON FIRST COST**... since no extra engineering and less labor costs are involved in fabricating unit substations.

6. increase **EFFICIENCY** of motors by supplying full voltage.

7. increase **EFFICIENCY** of lighting — eliminate flicker and get full illumination by supplying full voltage.

8. increase **TRANSFORMER CAPACITY** through use of Class B insulation (fiberglas and similar inorganic materials) which permits greater intermittent overload capacity.

9. increase **FLEXIBILITY** of system, since transformer and attached equipment may be easily relocated when necessitated by changes or moves in production equipment.

Standard Engineered and built Dry Type Power Load Centers provide all of the above plus permitting the user choice of make, type, and arrangement of accessory equipment.

TRANSFORMER CO. WARREN, OHIO

LIGHTING AND TESTING TRANSFORMERS . . . OIL, ASKAREL OR AIR COOLED

How Will You Handle Rebuilding and Maintenance?

Despite the easement of manpower, rebuilding and maintenance will continue to present problems of efficiency and economy. For more than 27 years, Hoosier engineers and trained men have served utilities in the erection and maintenance of transmission lines. Why not plan now to let Hoosier handle your future building and maintenance?

HOOSIER ENGINEERING CO.

1384 HOLLY AVE. COLUMBUS, OHIO

NEW YORK • CHICAGO

ERECTION AND MAINTENANCE OF TRANSMISSION LINES

Selected crudes . . . careful refining . . . special fortifying . . . spell dependability in Shell Turbo Oil

TROUBLE-FREE turbine operation results largely from using the right kind of oil . . . not just ordinary lubricating oil "doped" for turbine use.

And trouble-free operation is what users of Shell Inhibited Turbo Oil have learned to expect. Because to make this oil, Shell selects crudes with inherent stability and demulsibility.

These specially selected crudes get special treatment all along the manufacturing line. Refining is by a solvent extraction process to enhance the goodness already in the oil. Special fortifying gives it anti-oxidation and rust-preventive qualities as well as maximum metal-covering ability and high film strength.

As a result, Shell Inhibited Turbo Oils have shown little or no trace of OXIDATION after years of service in marine, industrial and public utility installations. They have completely prevented RUST FORMATION, resisted STRUCTURAL BREAKDOWN over similar periods—far surpassing the performance of replaced oils.

Ask the Shell man to show you industrial "service records" of this remarkable turbine oil. Shell Oil Company, Incorporated, 50 West 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Cal.

SHELL

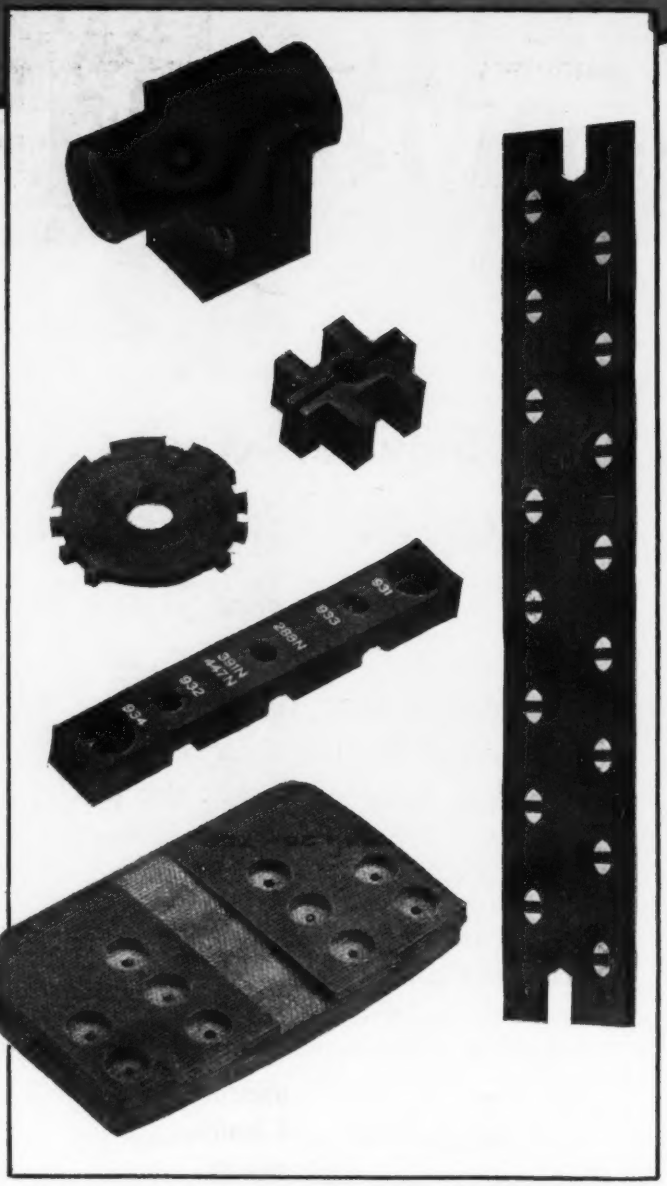
SHELL TURBO OIL

Use Panelyte Fabricated Parts where corrosion is a Problem

Panelyte laminated plastic parts are not affected by water, brine, oil, ordinary solvents, coolants, ketones, esters, weak acids or alkalis. Having good electrical properties combined with unusual structural strength, dimensional stability, and excellent heat resistance, Panelyte is thoroughly dependable and adaptable. Easily machined to exact specifications, weight-saving Panelyte parts are mass-produced in our new plant.

Our policy of working closely with customers' engineering departments enables us to give designing aid, and from performance data on hand, to make accurate estimates on the service life of proposed applications.

Inquiries are invited on sheets, rods, tubes, and *molded* as well as fabricated parts. Write for factual "Engineering Data Book".



Typical examples of lathe turning, grooving, printing, milling, shaving, and die-punching.

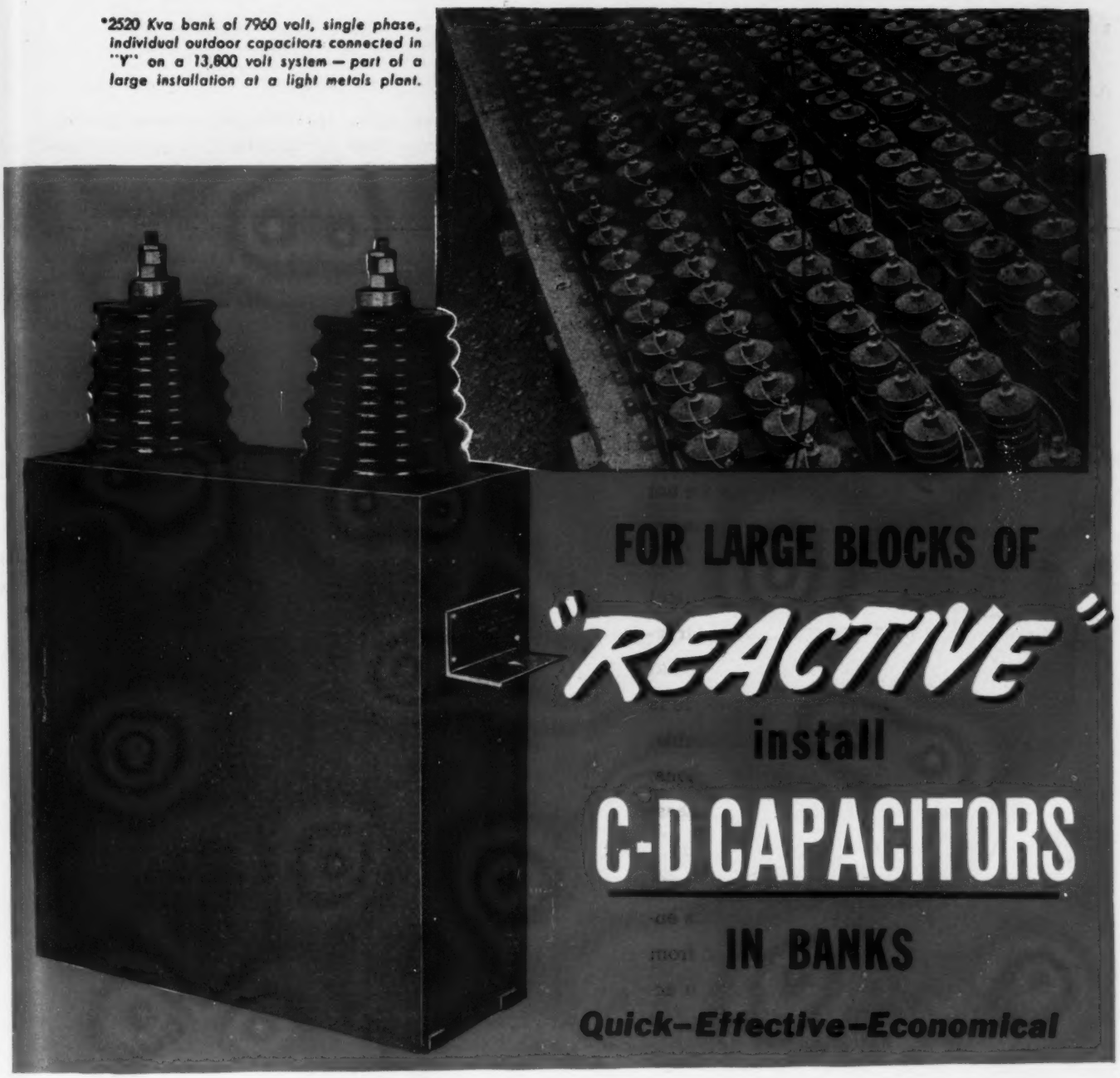
PANELYTE — *the structural plastic*

PANELYTE DIVISION
ST. REGIS PAPER COMPANY
230 PARK AVENUE
NEW YORK 17, N. Y.

Sales Offices: Atlanta, Boston, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, Nashville, New Orleans, Phoenix, Portland, St. Louis, St. Paul, San Francisco, Seattle, Syracuse, Trenton: Buenos Aires, Johannesburg, Mexico City, Montreal, San Jose, Sao Paulo, Sydney, Toronto, Vancouver.

★ MASS PRODUCTION OF SHEETS, RODS, TUBES, MOLDED FORMS, FABRICATED PARTS IN PAPER, FABRIC, FIBRE GLASS, ASBESTOS BASE LAMINATES; DECORATIVE GRADES

*2520 Kva bank of 7960 volt, single phase, individual outdoor capacitors connected in "Y" on a 13,800 volt system — part of a large installation at a light metals plant.



FOR LARGE BLOCKS OF "REACTIVE" install C-D CAPACITORS IN BANKS

Quick–Effective–Economical

You can increase voltage at critical load points and improve system capacity by installing banks of C-D Capacitors. Up to 50,000 Kva, large blocks of leading reactive current can be obtained quickly by this method . . . solving the problem of new concentrated loads.

C-D Capacitor banks can be easily reassembled to provide any variation in corrective capacity supplied to meet load requirements. Capacitors afford an electrical and physical flexibility not available in other types of equipment.

Our engineers will be glad to show you how C-D Capacitors can help increase system capacity now—and continue to work for you in the future. Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey.

Cornell-Dubilier Capacitors

FOR POWER-FACTOR IMPROVEMENT

CARRIER CURRENT COUPLING • SURGE PROTECTION

INSULATING MATERIALS—no matter how efficient—often are starting places for corrosion. The electrolytic action of current-carrying copper wire and moisture causes chemical decomposition, and corrosion is the result.

With LUMARITH CA (cellulose acetate) film and foil insulation such corrosion hazards are eliminated. Lumarith is inert to electrolytic action—releases no wire attacking acids.

In addition, Lumarith films and foils are high in dielectric strength and arc resistance. (A.S.T.M. tests show Lumarith recovering original or greater arc resistance when conducting path is allowed to cool and arc is struck a second time.)

Lumarith CA is a Celanese plastic. It is available in sheets, rods, tubes and molding materials as well as in films and foils. Films and foils can be supplied in crystal clear transparent or with special (A-78) mat finish one side. A-78 finish increases visibility and prevents wire slippage. Celanese Plastics Corporation, a division of Celanese Corporation of America, 180 Madison Avenue, New York 16, New York.

JUST PUBLISHED

Electrical Booklet entitled "Celanese Synthetics For The Electrical Industry." Contains technical information you will need. Write for your copy today.

*Reg. U. S. Pat. Off.

THE BLACK HAND IS ALWAYS LOOKING FOR TROUBLE

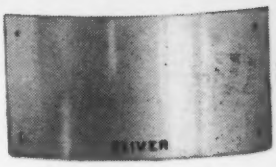
Electrical equipment
Insulated with
*
LUMARITH CA
CELLULOSE ACETATE
is safe against the Black Hand of electro-chemical corrosion

A Celanese* Plastic

OLIVER
GUYING MATERIALS

FROM THE COMPLETE LINE
OF **OLIVER**
POLE LINE MATERIALS

STRAIN PLATES

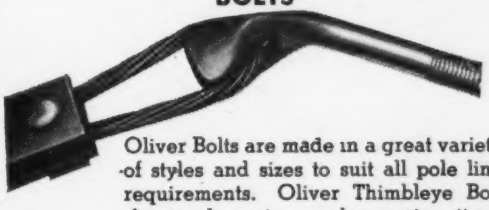


Provide wide bearing surface that protects the pole against cutting by guy strands. Several types available.

GUY HOOKS

Supports guy strand and prevents slipping. Half-oval steel protects strand. Made in light, medium and heavy sizes, in addition to many types of special Oliver Guy Attachments.

BOLTS



Oliver Bolts are made in a great variety of styles and sizes to suit all pole line requirements. Oliver Thimbleye Bolt shown above is popular guying item.

GUY CLAMPS

Made in all sizes and capacities required for guying service. Sturdy construction, accurately fitting.

STRAIN INSULATORS

Made from high quality dry process or wet process porcelain, with well-rounded corners and surfaces. Complete line for guying and other services.

ANCHOR RODS

This important feature of guying has been given careful attention by Oliver engineers. The various types of Oliver Anchor Rods are described in the complete Oliver Catalog.

1 they are PROPERLY DESIGNED

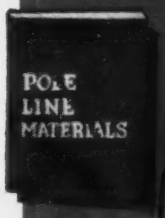
Oliver experience dates from the very beginning of the pole line hardware industry—and today Oliver designs reflect the most modern engineering practice.

2 they are WELL MADE

Manufacturing processes employed by Oliver include the most up-to-date methods of forming and finishing. Metal parts are protected by galvanized coatings.

3 they are DEPENDABLE AND ECONOMICAL

Users find that Oliver Pole Line Materials represent highest quality—providing long life and economical service. Always a good investment.



For many other items
see OLIVER CATALOG NO. 43

OLIVER
IRON AND STEEL
CORPORATION
South Tenth and Muriel Streets
Pittsburgh 3, Pennsylvania

SOLD THROUGH ELECTRICAL WHOLESALERS

It smothers fires that lurk underground!

FIRE in underground cables? Rush a Kidde Trailer Unit to the scene.

Shoot flame-smothering carbon dioxide—stored under high pressure in the Trailer's cylinders—down the nearest manhole. Working its way through underground ducts, the gas quickly penetrates to the point of origin of the fire . . . and kills it *fast.* No pumps needed to furnish the fire-fighting punch—just the stored energy of the carbon dioxide itself!

And because carbon dioxide is dry, inert, nonconducting, it cannot damage cable insulation . . . cause short circuits . . . or corrode metal parts.

The Trailer Unit, of course, is just one piece of apparatus in the comprehensive line of Kidde equipment for safeguarding electrical fire hazards. Check the list below—and ask a Kidde representative to suggest the *best* type of protection.

* * *

KIDDE KILLS TOUGH FIRES *in Generators, Motors, Synchronous Condensers, Rotary Converters, Transformers, Oil Circuit Breakers, Lightning Arresters, Rectifiers, Regulators and Oil Reclamation Processes.*

Walter Kidde & Company, Inc., 1230 Main Street, Belleville 9, New Jersey

K Kidde

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

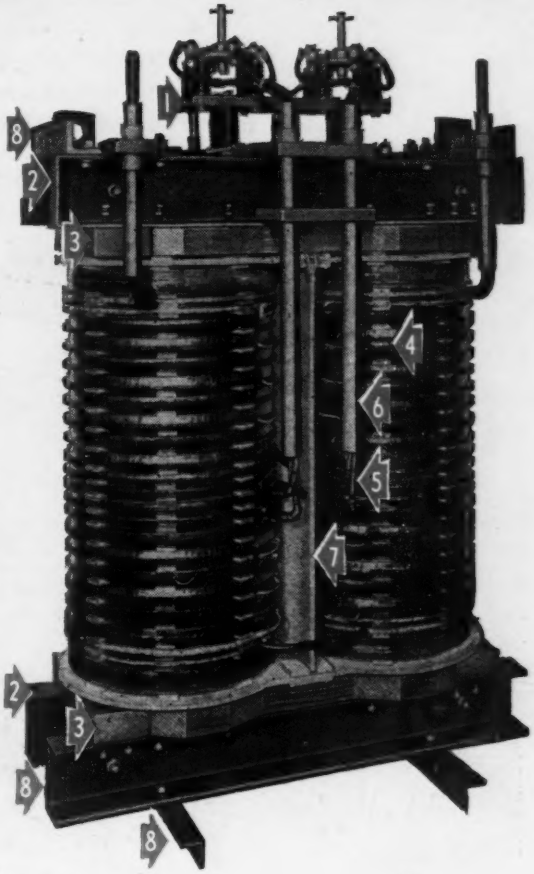
Kidde

Wagner DISTRIBUTION TRANSFORMERS
Provide a Plus Combination of Superior Characteristics

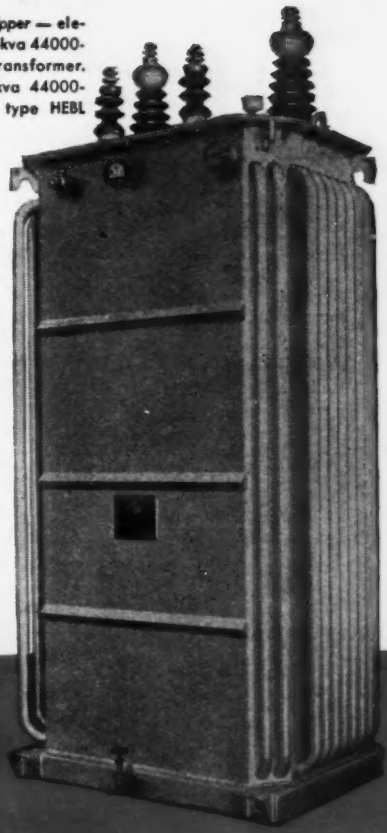
Wagner transformers have a fine reputation for being able to stand up in service—and there are many reasons, too many to list in the space limitations of a single advertising message.

The features listed below are but a few of many reasons why Wagner transformers stay on the job under severe operating conditions.

1. Tap-changers are carefully mounted to provide high dielectric and mechanical strength with proper alignment.
2. Top and bottom endplates and associated parts are made up of fabricated structural steel forms rigidly bolted together. All nuts are locked in place by means of pal-nuts or other approved shakeproof devices.
3. Coil-clamps of oil-treated maple effectively clamp the coils and prevent distortion under operating conditions.
4. High-voltage single-division coils are separated from each other by insulating washers.
5. Taps are brought out in the middle of the winding where they offer no real problem as far as weakening coils and causing breakdowns.
6. Tap-leads are grouped together and carried thru insulating tubes to the terminal-board or tap-changer. This procedure mechanically supports the leads in the space necessary for proper electrical clearances.
7. Barriers of heavy pressboard between the two legs of the windings prevent flashover.
8. The element is securely braced against horizontal and vertical shifting. The lower clamping members are extended to the dimensions of the tank; the top members are anchored to the tank walls.
9. Low-voltage cylindrical-type coils are amply provided with oil-ducts passing through their entire length, assuring effective cooling throughout the winding.
10. An insulating cylinder supplemented by an oil-duct on each side provides insulation between the high-voltage and the low-voltage coils.



Illustrations: Upper — element of a 333-kva 44000- to 600-volt transformer. Lower — 500-kva 44000- to 2400-volt type HEBL transformer.



TRANSFORMERS
are but one of several WAGNER PRODUCTS serving industry.
Other WAGNER PRODUCTS:
AIR BRAKES
•
BRAKE LINING
•
HYDRAULIC BRAKES
•
INDUSTRIAL BRAKES
•
INDUSTRIAL BRAKE CONTROLS
•
NoRoL
•
TACHOGRAPH
(Recording Speedometer)
•
ELECTRIC MOTORS

These 29 Sales and Service Branches Are Ready to Serve You - -

For complete information on Wagner distribution transformers (or other types of Wagner transformers such as power, air-cooled, substation, rural-line, etc.) write to the address below or to the nearest of these 29 branches manned by trained field engineers who are ready to help you solve your transformer problems:

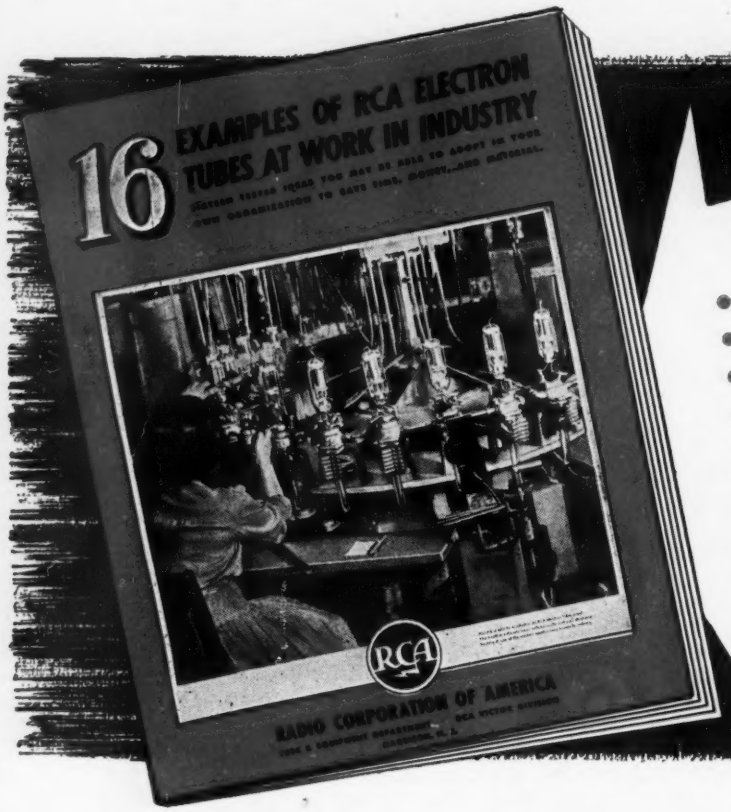
ATLANTA 3 • BALTIMORE 18 • BOSTON 15 • BUFFALO 8
CHICAGO 16 • CINCINNATI 10 • CLEVELAND 15 • DALLAS 1
DENVER 2 • DETROIT 2 • HOUSTON 2 • INDIANAPOLIS 4
KANSAS CITY 8 • LOS ANGELES 15 • MEMPHIS 3 • MILWAUKEE 2
MINNEAPOLIS 4 • NEW YORK 7 • OMAHA 2 • PHILADELPHIA 8
PITTSBURGH 13 • PORTLAND 9 • ST. LOUIS 3 • SALT LAKE CITY 1
SAN FRANCISCO 3 • SEATTLE 4 • SYRACUSE 2 • TULSA 3
WASHINGTON D. C. 5

T45-6A

Wagner Electric Corporation
ESTABLISHED 1891
6456 Plymouth Avenue, St. Louis 14, Mo., U. S. A.
In Canada: Wagner Electric at Leaside, Ontario
ELECTRICAL AND AUTOMOTIVE PRODUCTS

FREE. TO INDUSTRIAL ENGINEERS AND EXECUTIVES

20-page booklet showing how electronic equipment is being used in industry today—to cut costs, increase production, and improve product quality



CONTENTS—How Electron Tubes . . .

- protect workers
- analyze colors
- control lighting
- provide high-speed switching
- "time" machine-tool operations
- speed wood-bonding 700%
- sort mountains of beans
- provide split-cycle timing
- speed soldering 2400%
- direct traffic
- prevent fire and explosion
- speed surface hardening
- test springs
- dry penicillin 4700% faster
- prevent paper waste
- detect hidden flaws in metal

HERE—in convenient, easy-to-read form—are sixteen authentic case histories, telling how different industrial electronic devices work, and how they have saved time, money, and materials, for many different industries. Simply written, non-technical, illustrated, these case histories contain many ideas that may be useful to you.

What the booklet can do for you—Any of the ideas discussed in this booklet may suggest ways in which *your* company can adopt electronic methods to save money, increase production, perform manufacturing operations not possible by other means—or ways in which electronic devices can be designed into the products you manufacture to provide improved performance.

Authentic case histories—Case histories like these, which have appeared in RCA advertising for over two years, have attracted much favorable comment from industrial engineers and executives. Because the information they contain has proved so useful, 16 of the most popular applications have been reprinted in this 11" x 14" booklet.

Send for YOUR copy today—For your free copy of this booklet, write to us for "16-Examples Booklet," or simply attach the coupon below to your company letterhead. Please indicate your position, and mail it to us *today*.

MAIL TODAY WITH YOUR COMPANY LETTERHEAD

Radio Corporation of America
Commercial Engineering Department, Section 62-62W
Harrison, New Jersey

Your booklet, "16 Examples of RCA Electron Tubes at Work in Industry," containing authentic case histories of industrial electronic applications (with photographs, drawings, diagrams, etc.) is of interest to our company. Please send my free copy to:

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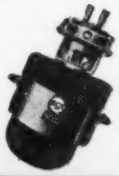
The Fountainhead of Modern Tube Development is RCA

BUY BONDS AND KEEP 'EM!

RCA



RADIO CORPORATION OF AMERICA

TUBE DIVISION, HARRISON, N. J.

Better Construction Today—
Less Maintenance Tomorrow

KEARNEY PROTECTED THREAD CON-NEC-TAP CLAMP

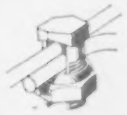
Grease filled chamber houses screw—prevents corroding. Line connection stays tight—spring washer maintains constant pressure. Vibration or expansion and contraction won't loosen their grip.

KEARNEY TRIP-O-LINK FUSE CUTOUT

For practical and dependable low cost protection. Single unit link and cartridge construction provides new arc-extinguishing cartridge with each fuse replacement. Also available in two-shot and three-shot reclosing types.

KEARNEY HI-LINE DISCONNECT STICK

Light, yet stands much abuse. Ferrule type metal head. Kearney takes special care in selecting and treating laminated poles for Hi-Line tools used on hot line work.



KEARNEY CON-NEC-TITE

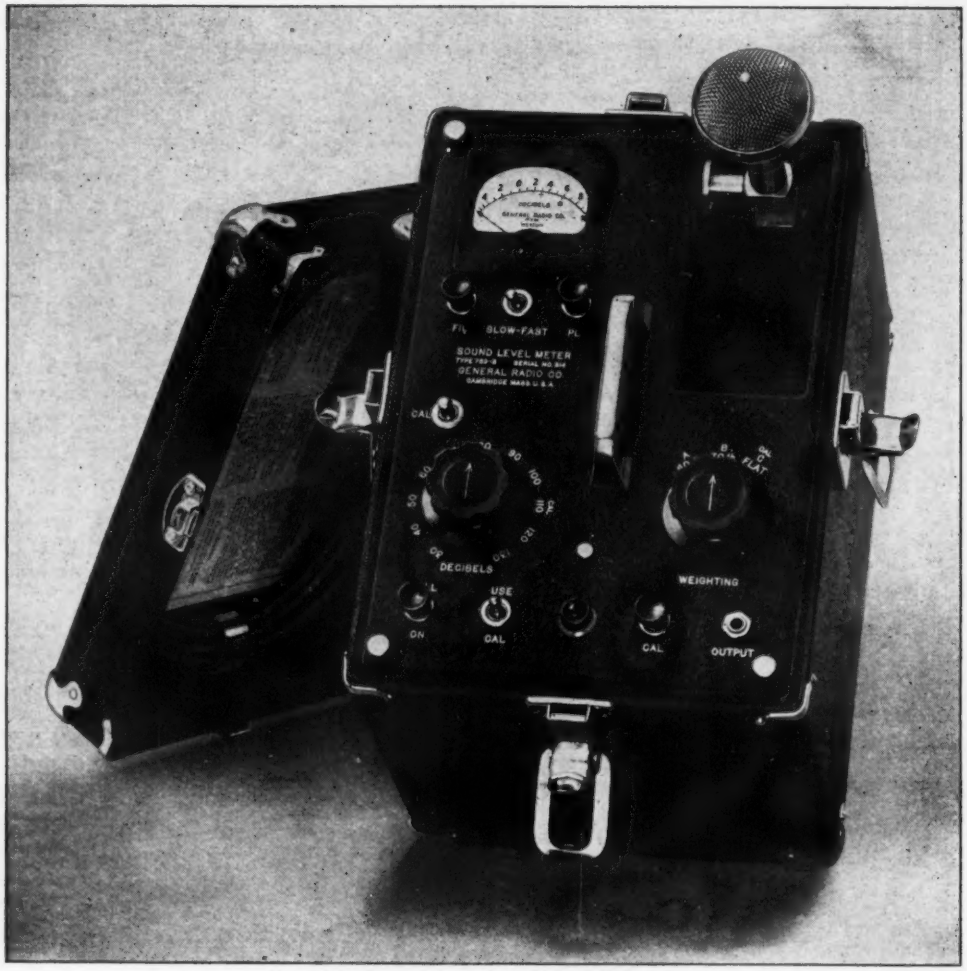
Reduce costs with these permanent, positive, solderless connectors. Fast and easy to use.

KEARNEY PRODUCTS

JAMES R. KEARNEY CORPORATION OVERHEAD & UNDERGROUND UTILITY EQUIPMENT

4224-42 CLAYTON AVE., SAINT LOUIS 10, MO.—*Canadian Plant*, LEASIDE, ONTARIO

SOUND MEASUREMENTS ARE EASY WITH THIS ACCURATE, RUGGED PORTABLE METER



● The General Radio Sound Level Meter makes possible the measurement of intensity of sound conveniently, quickly and accurately by anyone. This instrument is widely used throughout industry for all types of noise measurement and study. It is completely self-contained and portable, and will measure the volume of sound from a whisper to a locomotive whistle.

FEATURES

1 **EXCEPTIONALLY WIDE RANGE**—24 to 140 decibels
2 **SIMPLE CONTROLS**—complete db range is covered by a single control knob
3 **IMPROVED MICROPHONE**—crystal, diaphragm, type of great sensitivity, very rugged, and unaffected by ordinary changes in temperature and humidity
4 **PLUG-IN MICROPHONE**—normally used directly on folding socket on instrument, but can be detached and used with cable and tripod
5 **SLOW-FAST METER**—control switch selects either movement; "fast" position corresponds to A.S.A. tentative standards; on "slow" position the meter is heavily damped to measure the average level of rapid fluctuations
6 **INTERNAL CALIBRATION SYSTEM**—calibration can be checked quickly at any time from built-in calibrator
7 **THREE WEIGHTING NETWORKS**—low level, high level and substantially flat over-all response
8 **NO COILS**—instrument contains no coils or inductances and accordingly gives accurate readings in the presence of any ordinary magnetic field

TYPE 759-B SOUND LEVEL METER $195

WRITE FOR BULLETIN 979 FOR COMPLETE INFORMATION

GENERAL RADIO COMPANY Cambridge 39, Massachusetts

90 West St., New York 6 920 S. Michigan Ave., Chicago 5 1000 N. Seward St., Los Angeles 38

MITCHELL-RAND offers...

6 different brands of *Varnished Tubing*

...TO COVER EVERY KNOWN REQUIREMENT

Standard

Double Saturated

Triple Strength

Impregnated

Hygrade

Mirac

FIBREGLAS (INORGANIC) VARNISHED TUBINGS

M-R Fibreglas Varnished Tubings are made in four grades; Standard; Double Saturated; Triple Strength and Impregnated.

STANDARD GRADE has maximum flexibility, is treated with a minimum of varnish and recommended for high temperatures where dielectric strength is not a factor.

DOUBLE SATURATED has all qualities of the Standard Grade but with additional coats of varnish to bring the dielectric rating up to 1500 volts.

TRIPLE STRENGTH is built up with coats of especially flexible insulation varnish for dielectric ratings up to 3,000 volts and is particularly suited where assembly operations include the possibility of rough handling.

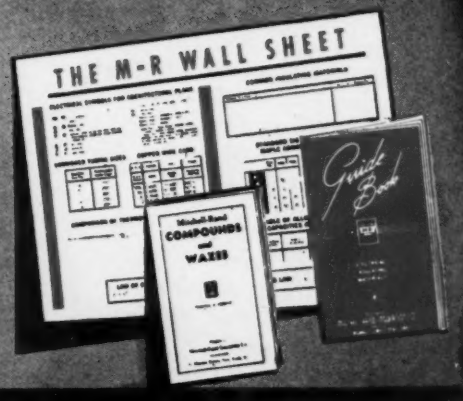
IMPREGNATED is the Optimum in Superiority for high gloss, non-hydroscopic, resistance to high temperatures, oils, acids, etc. IMPREGNATED has a dielectric rating beyond 8,000 volts and is unequalled for Long Life Under Most Severe Conditions. Write For Samples.

FOR USERS OF COTTON YARN VARNISHED TUBINGS

The Mitchell-Rand MIRAC and HYGRADE Varnished Tubings of long staple fibre yarn are comparable to Fibreglas Tubings in dielectric ratings, tensile strength, flexibility and long life. Write For Samples.

FREE FOR THE ASKING

Write today for your free copy of the M-R WALL CHART with its engineering tables, electrical symbols, carrying capacities of conductors, dielectric averages, thicknesses of insulating materials, tubing sizes, tap drill sizes, etc.



MITCHELL-RAND *for 56 YEARS* THE ELECTRICAL INSULATION HEADQUARTERS

EST. 1889

MITCHELL-RAND INSULATION COMPANY, INC.

51 MURRAY STREET COrtlandt 7-9264 NEW YORK 7, N.Y.

A PARTIAL LIST OF M-R PRODUCTS

Fiberglas Varnished Tape and Cloth
Insulating Papers and Twines
Cable Filling and Pothead Compounds
Friction Tape and Splice
Transformer Compounds

Fiberglas Saturated Sleeving, Varnished Tubing
Asbestos Sleeving and Tape
Varnished Cambric Cloth and Tape
Mica Plate, Tape, Paper, Cloth, Tubing

Fiberglas Braided Sleeving
Cotton Tapes, Webbings and Sleevings
Impregnated Varnish Tubing
Insulating Varnishes of all types
Extruded Plastic Tubing

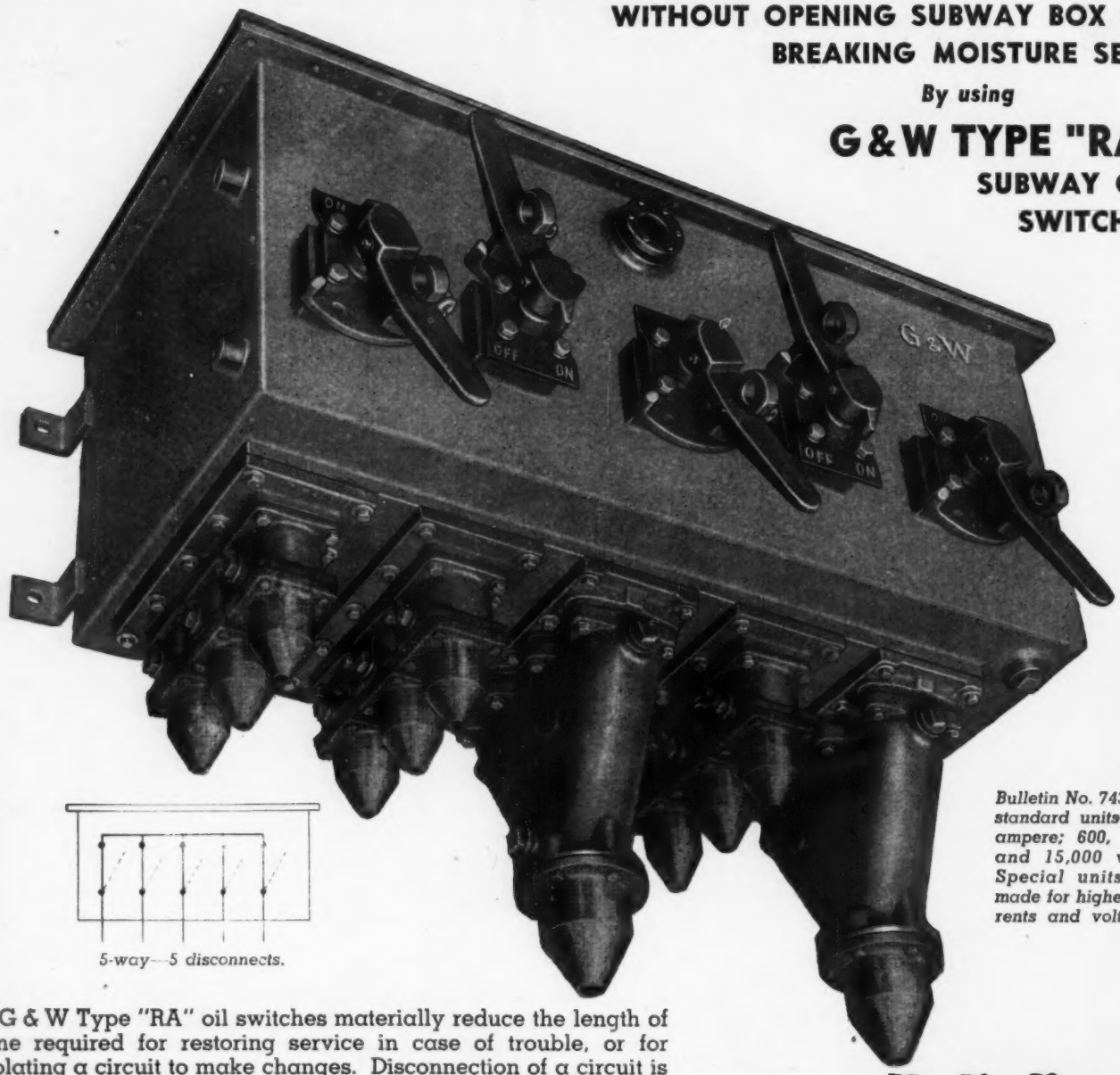
Disconnect underground cable circuits

WITHOUT OPENING SUBWAY BOX OR BREAKING MOISTURE SEAL

By using

G&W TYPE "RA"

SUBWAY OIL SWITCHES



5-way—5 disconnects.

Bulletin No. 743 lists standard units—400 ampere; 600, 7,500 and 15,000 volts. Special units are made for higher currents and voltages.

G & W Type "RA" oil switches materially reduce the length of time required for restoring service in case of trouble, or for isolating a circuit to make changes. Disconnection of a circuit is accomplished by merely operating an external handle—*without opening the tank or breaking the seal.*

Sectionalizing devices should be safe and reliable — they should be simple in design and construction — they should be proved by several years experience under various conditions of installation. They should not fail to function properly even though they may not be operated over long periods of time.

G & W Type "RA" oil switches and multiple circuit subway oil disconnects meet these requirements. Originated in 1928, they have an excellent service record. They are simple and practical —ordinarily consisting of only three elements . . . rocker arm link assemblies, welded steel tanks and unit sealed cableheads. These elements can be arranged in many different forms.

Write us or our nearest representative for further data.

ROCKER ARM LINKS

Self-aligning floating contact links are encased in porcelain bushings which are in turn clamped between impregnated wood straps. The links pivot on one set of stationary contacts.

G&W ELECTRIC SPECIALTIES

Originators and pioneers of equipment for sound methods of underground and overhead electric distribution.

G&W ELECTRIC SPECIALTY CO.

2780 DANTE AVE., CHICAGO 19, ILL., U. S. A.

Also made in Canada by Powerlite Devices, Ltd., Toronto

Potheads . . . Boxes . . . Oil Fuse Cutouts . . . Oil Switches . . . Multiple Circuit Disconnects

LIGHTING GLASSWARE

From Oil Lamps

TO FLUORESCENT LIGHTING

Remember the era of the kerosene lamp with its clear glass chimney and its flower-decorated, frosted glass base and shade? Glass came into its rightful place when the early designers of those lamps realized that glass could be used to improve appearance as well as to transmit light. Corning played an important part in the early development, engineering and design of that lighting glassware, just as today they are helping all those interested in better lighting to get the best results from fluorescent lamps.

Glass has been the accepted lightingware standard for years. Its many advantages include:

1. *Brilliance and lustre.*
2. *Ease of cleaning.*
3. *Permanent size and shape.*
4. *Permanent colors and hues.*
5. *Surface hardness that resists scratching.*
6. *Heat resistance and no warpage.*
7. *High light transmission combined with low surface brightness.*

All of those features contribute to permanent appearance and performance.

Regardless of what your lighting glassware problems may be, please feel free to submit them to Corning engineers. Years of experience and research —production know-how and facilities—are all available to give you the best in lighting glassware. If you have not already received your copy of the Corning "Lighting Data," send for it today. Write to Lighting Sales Dept., EW 12 Corning Glass Works, Corning, N. Y.

"CORNING" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

ORNING
means
search in Glass

Corning Engineered Lightingware
BRAND

Performance in service depends on control in manufacture

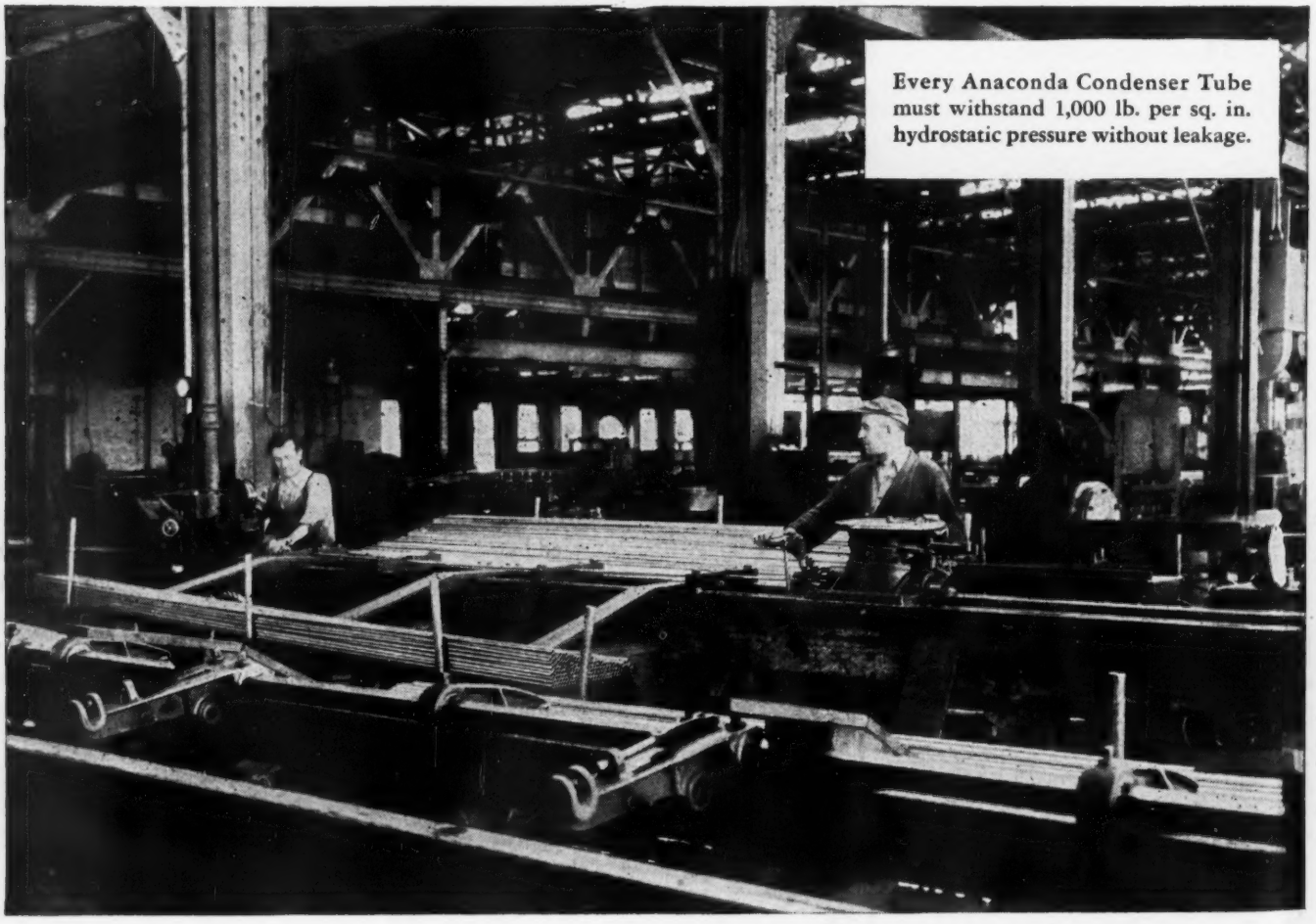
TECHNICAL RESEARCH, scientific production controls and the most searching inspection procedures insure the quality of Anaconda Condenser Tubes.

Each tube is subjected to hydrostatic test, surface inspection and checked for roundness, straightness, length, diameter and thickness.

Tubes from every lot of 600 undergo chemical analysis to check the alloy and microscopic examination to determine grain structure in accordance with A.S.T.M. Specifications.

The American Brass Company provides not merely accurate production in a wide range of Anaconda Condenser and Heat Exchanger Tube Alloys, but technical experience gained over the years in the study and solution of thousands of special heat transfer problems . . . all of which is at your service.

Publication B-2 lists Anaconda Condenser Tube Alloys, describes manufacturing processes, compositions and fields of application. We'll be glad to send you a copy. 44187



Every Anaconda Condenser Tube must withstand 1,000 lb. per sq. in. hydrostatic pressure without leakage.

ANACONDA
from mine to consumer

Anaconda Condenser Tubes

THE AMERICAN BRASS COMPANY—General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company—In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

NEW!

Cardolite #5616

TRADE-MARK

Cold-Pouring Filling Compound

Solventless — sets at room temperature to resilient, rubbery mass — non-inflammable — has no melting point when set — resists embrittlement to below —40°C. — excellent adhesion to steel, brass, bakelite — easily removed for repairs!

Test Data

Dielectric Strength —
600 vpm on gap of 10 mils
Power factor at 20°C.
1000 cycles — 0.25
Resistivity — 10^7 megohms
Non-inflammable
No measurable shrinkage
Adhesion—
(between plates 2″ x 2″)
Bakelite 120 lbs.
Steel 105 lbs.
Brass 55 lbs.
Resistant to oil, gasoline, alcohol, water.

Developed specifically for filling voids in junction and terminal boxes, pot-heads, coils, transformer cases, etc., Cardolite #5616 offers important advantages not possessed by earlier, similarly employed materials. Cardolite #5616 is non-inflammable, solventless, non-shrinking, and will neither crack at low temperatures nor "run" at high temperatures. And the unique final state which Cardolite #5616 attains, permits quick, easily made circuit changes or repairs, when necessary. Cardolite #5616 can be cleanly removed without application of heat or time-consuming hand labor. Separate packaging of the liquid setting agent, Irvington #5612, precludes reaction during storage. When other preparations are complete, this setting agent is thoroughly mixed with Cardolite #5616 in the latter's conveniently oversize container. For full particulars, or generous test samples, write to Dept. 46, Irvington Varnish and Insulator Company, Irvington 11, New Jersey.

STANDARD OF THE WORLD
IRVINGTON INSULATION
TRADE REG. U.S. PAT. OFF. MARK

IRVINGTON
VARNISH & INSULATOR CO.
Irvington 11, New Jersey, U. S. A.

EXIDES DEPENDABLY PERFORM EVERY STORAGE BATTERY TASK

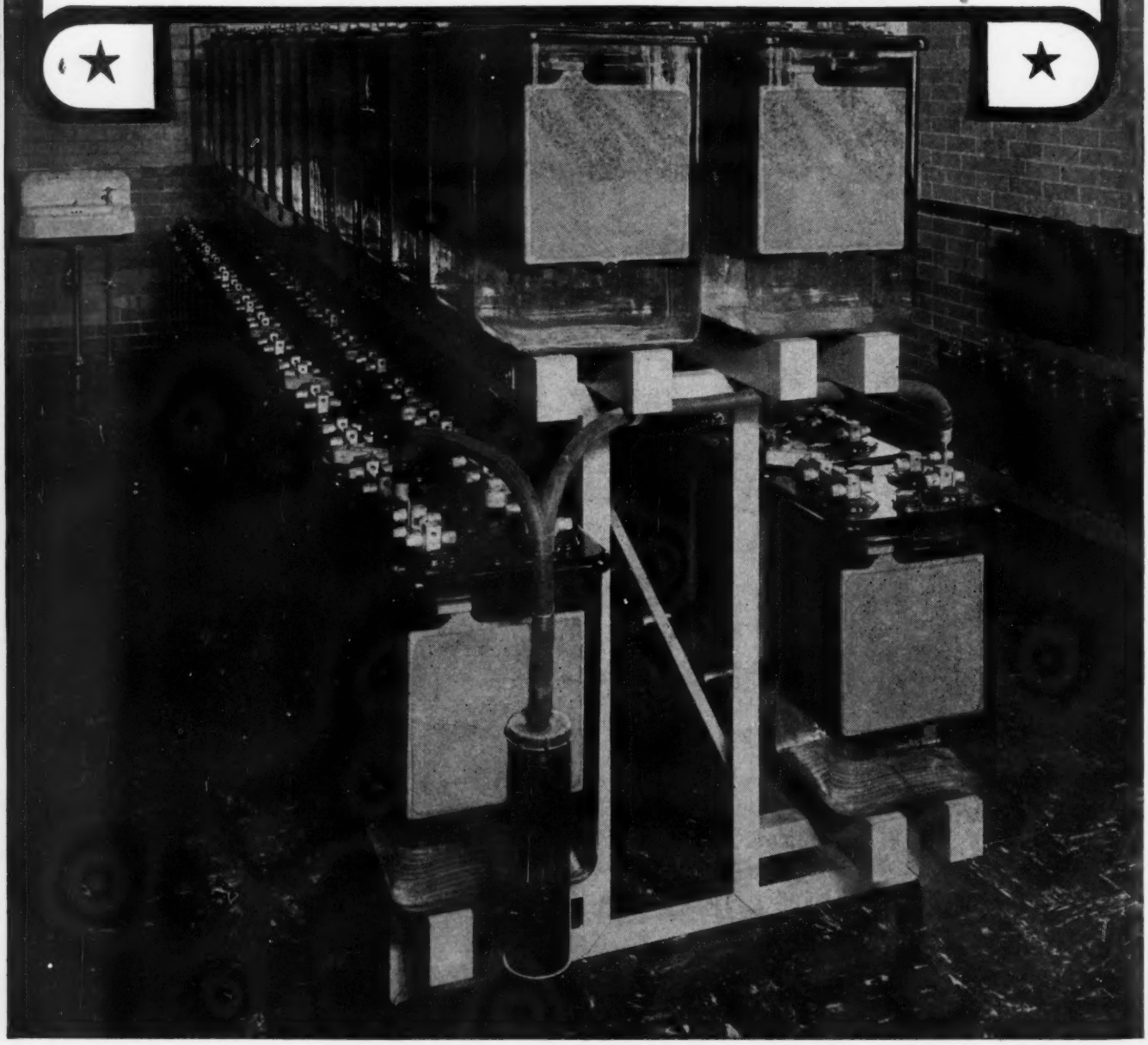
Whatever the storage battery job, you can always count on Exides for an adequate and uninterrupted supply of current. Because of their trustworthy performance Exides have long been the first choice of leading Central Stations for all storage battery duties . . . closing and tripping switch gear, operating control bus, supplying current for emergency lighting and many other tasks.

Exide makes several types of storage batteries for central station operations. These batteries have earned the confidence of engineers everywhere, and their widespread use is proof of their dependability, long-life and ease of maintenance.

No matter what your storage battery problems may be, Exide engineers will be glad to help you solve them.

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

Exide
BATTERIES



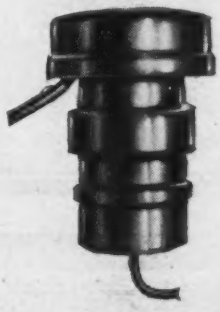
YOUR CHOICE OF 2 ARRESTERS FOR COMPLETE LIGHTNING PROTECTION

Westinghouse Type LV Autovalve and Type A "De-ion" Lightning Arresters are designed to "take it" —and provide for your system maximum protection against *all* lightning hazards. Microsecond recordings of many actual lightning discharges, plus thousands of tests with man-made lightning, supplied data for the development of Types LV and A Arresters.

Either arrester will protect equipment, reduce fuse outages, provide adequate capacity for handling both "hot" and "cold" lightning and afford extra service-free arrester life. With the development of Type LV Autovalve and Type A "De-ion" Arresters you now have your choice of specialized arrester characteristics to meet specific requirements—whatever they may be.

For added information on Westinghouse Lightning Arresters and where to apply them, call your Westinghouse distributor or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-60574



Type LV Autovalve Arrester
(3 to 15 kv incl.)

Isolating gap holds off rated voltage when not discharging lightning surge.

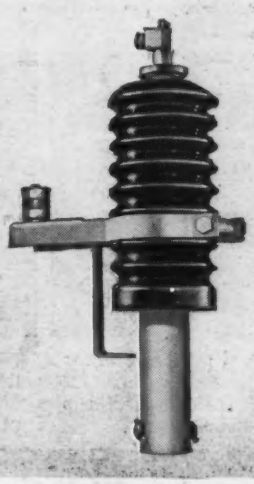
Pre-ionizing tips assure low, uniform impulse gap breakdown.

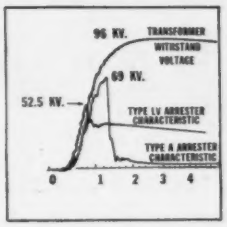
Pre-formed and pre-tested Autovalve block assures unchanging characteristics.

Assembled and sealed in dust and moisture-free room, and pressure-tested to assure exclusion of moisture in service.

Type A "De-ion" Arrester
(3 to 15 kv incl.)

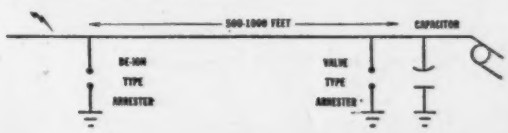
- Electrostatic shielding provides consistently low sparkover
- IR drop limited to arc voltage
- Loose fibre filler increases life by distributing discharges
- Mechanically spaced air gap prevents line lockout
- High thermal capacity helps handle "hot" lightning





Both Type LV and A Arresters protect—limit voltage to a value well below the apparatus impulse strength. In 95% of applications either gives needed protection.

For certain applications, each has particular advantages. Rotating machines, for example, are best protected by the use of both types of arresters. The valve type at the machine because of its lower sparkover, and gradual decay of discharge voltage; "De-ion" type on the line to drain lightning energy quickly off the system.



Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

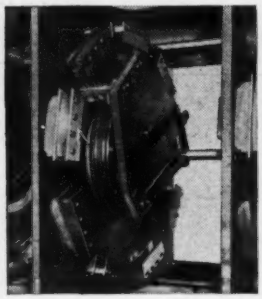
Lightning Arresters

Allis-Chalmers Offers You:

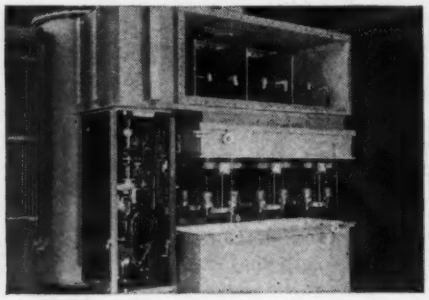
Advanced, Proven Transformer Load Ratio Control

A-C LOAD RATIO CONTROL REGULATES MORE THAN 8,000,000 KVA OF U.S. POWER

Skilled Workmen Make a Rugged Control Assembly

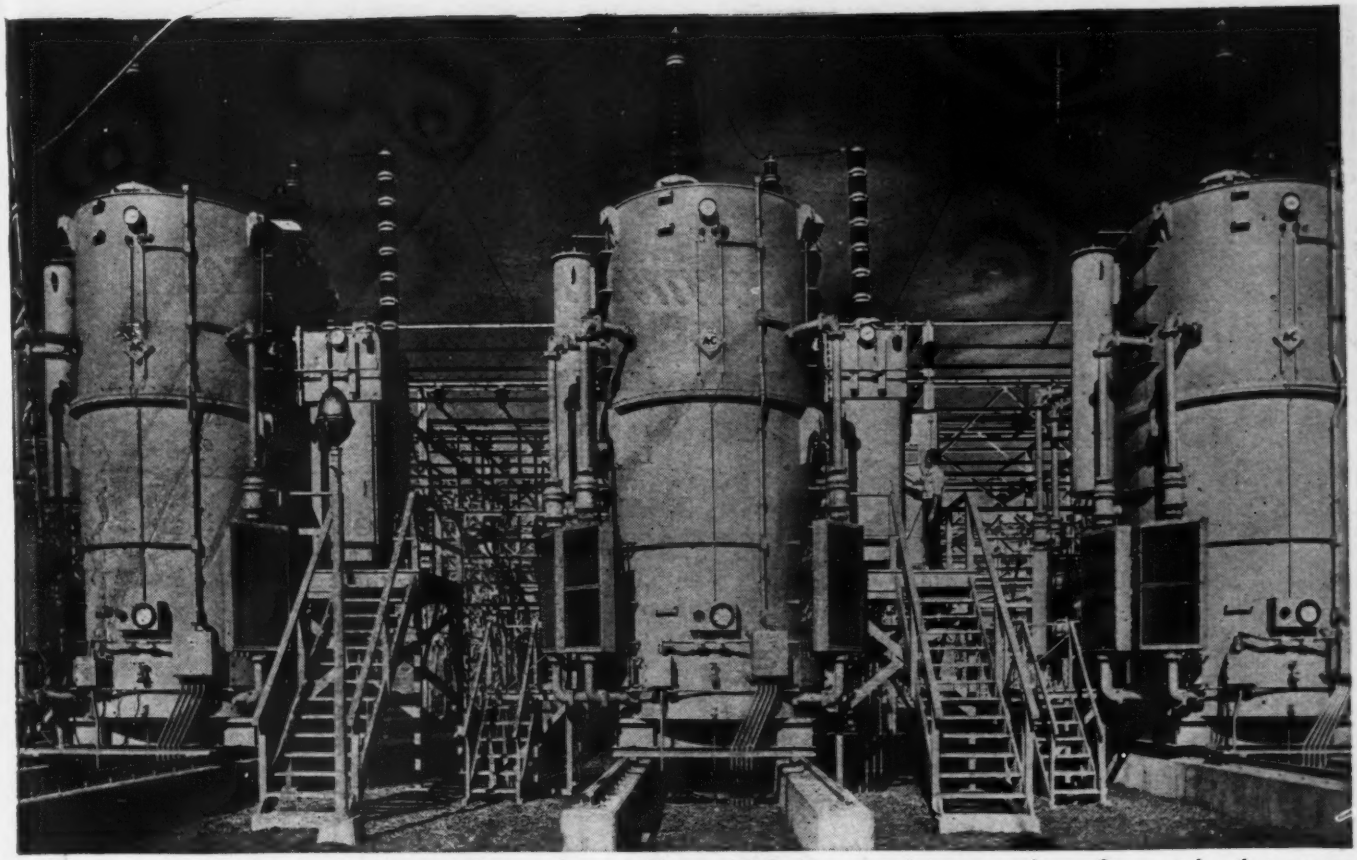


STURDY dial switch assembly typifies care which goes into building A-C load ratio control.

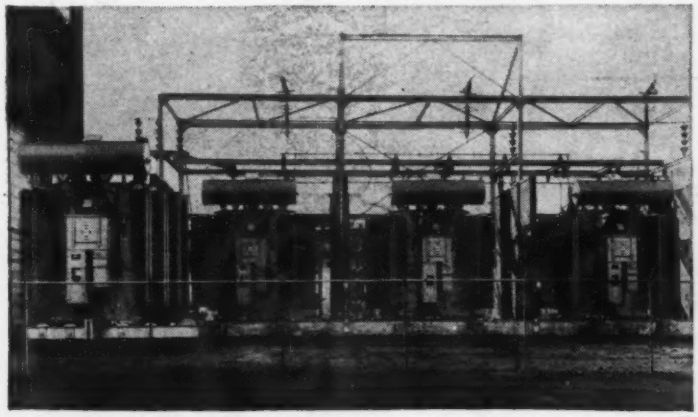


MAKING dependable load ratio control for power transformers demands the careful workmanship which skilled Allis-Chalmers machinists are able to supply.

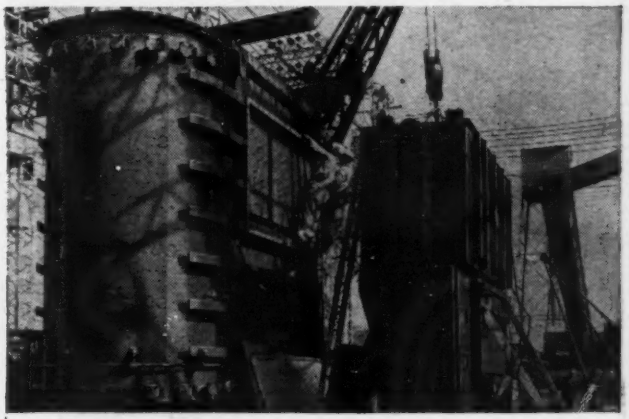
PARTS which go into the Allis-Chalmers load ratio control assembly are accurately aligned, to insure permanent precision operation.



AN EXAMPLE of using load ratio control to make possible a system tie is this 150,000 kva bank of Allis-Chalmers transformers. Today's system interconnections often require that power transformers be equipped with load ratio control.

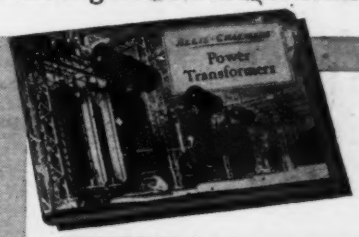


ALLIS-CHALMERS load ratio control is employed on two of the three windings used in these complex power transformers, which have given many years of dependable service to an Eastern utility.



A MIDWEST UTILITY recently installed this 24,000 kva Allis Chalmers power transformer, with load ratio control. Control compartment is shown being mounted on transformer tank.

INVEST IN ALLIS-CHALMERS *Power Transformers* WITH LOAD RATIO CONTROL



WRITE FOR GRAPHIC NEW ILLUSTRATED BULLETIN

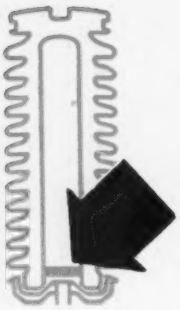
"Allis-Chalmers Power Transformers"

Sixteen installations; also picture-story of transformer manufacture. Ask for Bulletin B6402, ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 1959

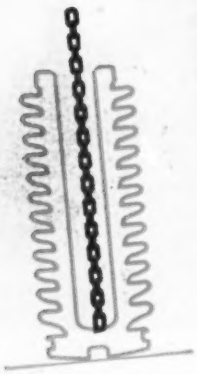
HERE'S THE DOUBLE FACTOR OF SAFETY IN LAPP LINE POSTS AND STATION POSTS

POSITIVE PERMANENT SEAL

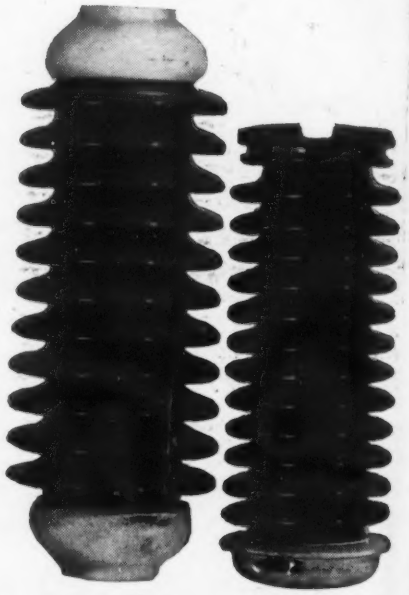


Lapp construction of Post insulators—for line and station use—is proved by a 15-year service record, during which Lapp Posts earned a reputation, *on actual record figures*, for most dependable performance under most difficult operating conditions. One reason is found in the exclusive Lapp construction features. Among these is a *porcelain-and-rubber plug*, inserted at the lower end of the finished porcelain, which permanently seals the interior against moisture.

NO HIDDEN CRACKS OR DEFECTS



The Post design is considered difficult of production because of the likelihood of internal cracks near the head of the insulator. Lapp production technique prevents this possibility. Each unit is fired as an open-end post; it is visibly inspected outside *and in;* and full flashover voltage is applied across the head section. This double factor of safety avoids puncture or flashover failure in Lapp Line Posts and Station Posts—assures dependable, economical performance on your system.



Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, N. Y.

PANTASOTE finds

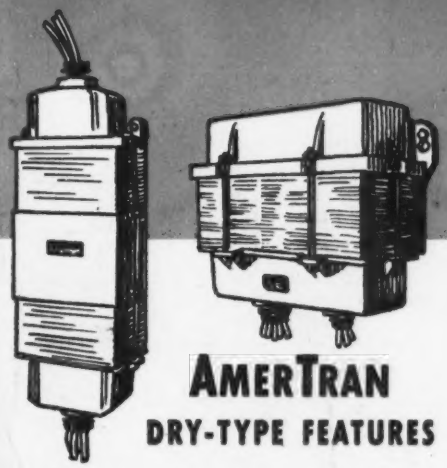
AMERTRAN

DRY-TYPE TRANSFORMERS

a Natural for Plant Distribution

The Pantasote Company's Passaic, N. J., plant is replacing a combination D.C.-A.C. system with an all A.C. system. Continuity of service during the changeover was a problem. Three AmerTran 37.5 KVA Dry Type Transformers were installed. At present these AmerTrans supply part of the lighting load, also 80 HP 3 phase 240 V. A.C. for power purposes. Eventually the AmerTrans will take the entire plant lighting load.

AMERICAN TRANSFORMER COMPANY
178 Emmet Street • Newark 5, New Jersey



AMERTRAN
DRY-TYPE FEATURES

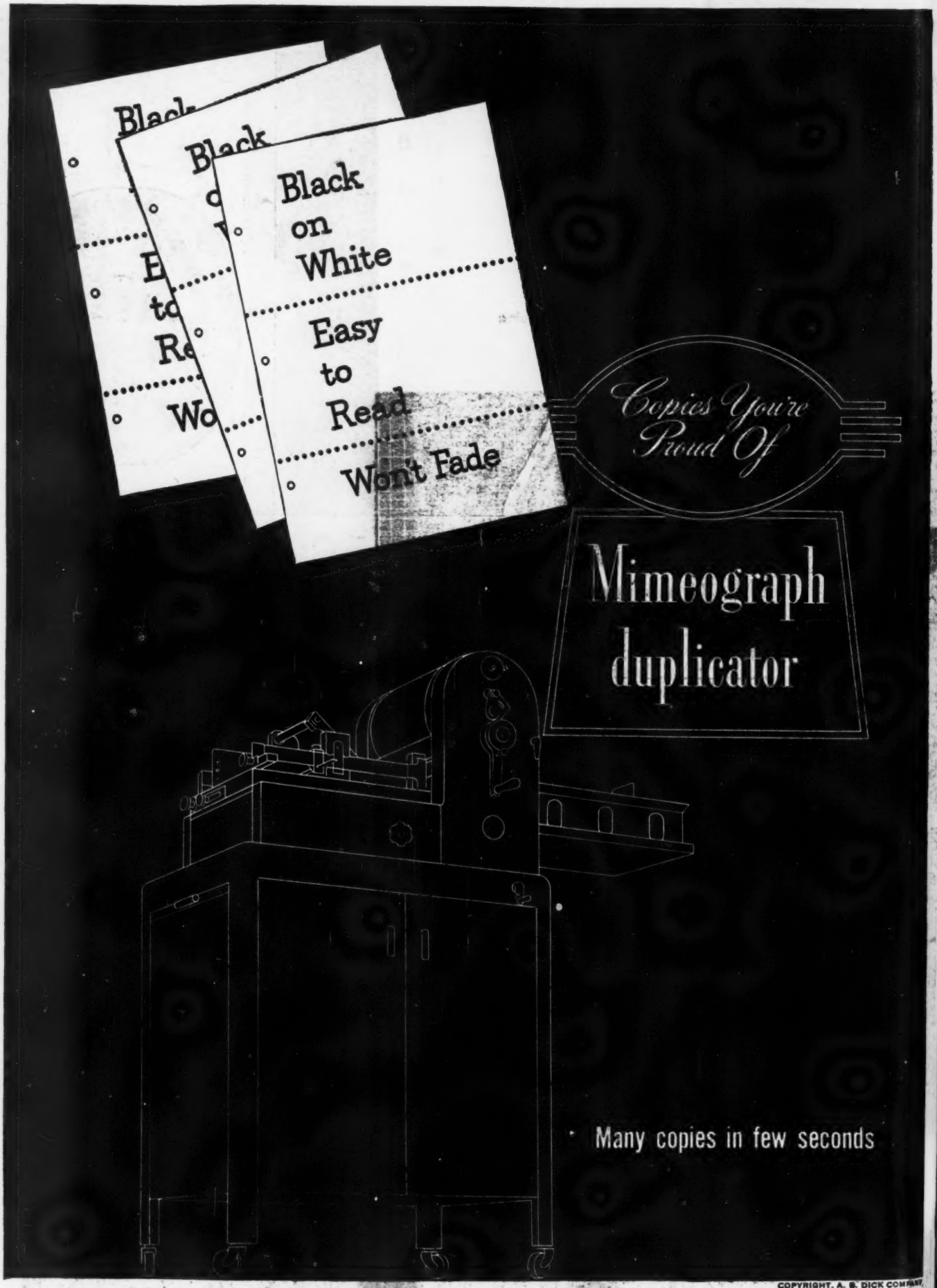
Compact and durable. Installed, indoors or outdoors, out of the way — in corners, on pillars, shelves, beams, ceilings—*at load* centers. Wide variety of ratings.

No maintenance; no piping; no liquid. Safe, clean efficient.

Pioneer Manufacturers of Transformers, Reactors and Rectifiers for Electronics and Power Transmission

AMERTRAN

MANUFACTURING SINCE 1901 AT NEWARK, N. J.



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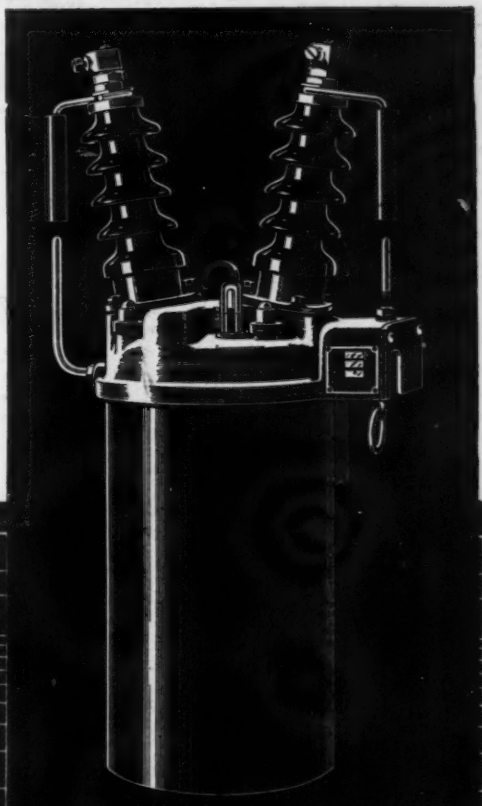
Type "H" KYLE Oil Circuit Reclosers
AUTOMATICALLY *keep MORE*
Lines in Service MORE of the time

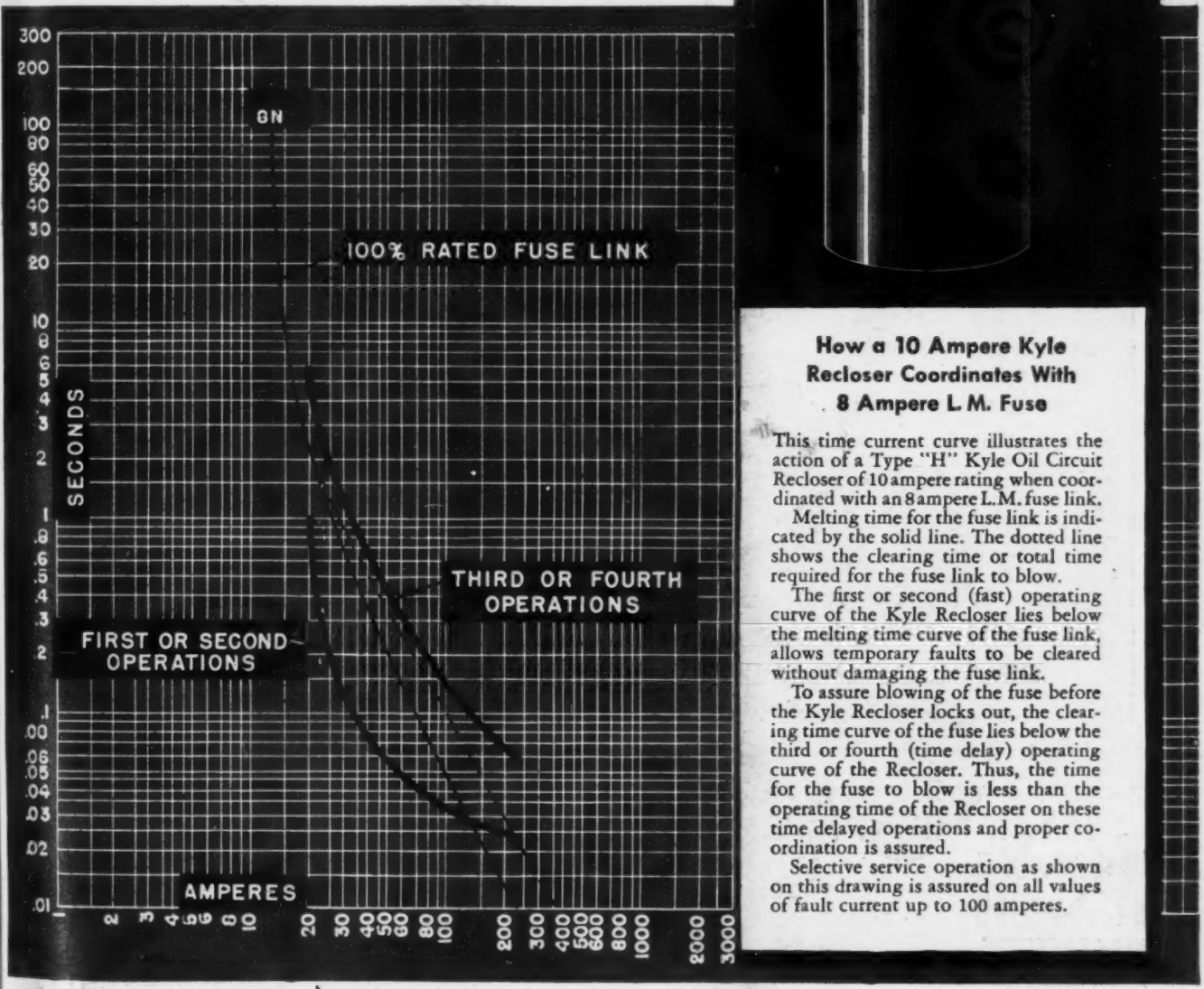
Use of Type "H" Kyle Automatic Oil Circuit Reclosers at strategic points gives greatest possible continuity of service.

Dual operating characteristics of Kyle Reclosers automatically act to protect the fuse links on all short-duration, temporary faults . . . save countless service trips. It is the result of the exclusive Kyle trouble-free hydraulic mechanism which gives:

1. Fast Opening on first and second operations . . . acts before the fuse can blow . . . automatically restores full service if the temporary fault is quickly cleared.

2. Time Delay Opening on third and fourth operations . . . permits the fuse to blow . . . isolates the short section of line that it protects.





How a 10 Ampere Kyle Recloser Coordinates With 8 Ampere L. M. Fuse

This time current curve illustrates the action of a Type "H" Kyle Oil Circuit Recloser of 10 ampere rating when coordinated with an 8 ampere L.M. fuse link.

Melting time for the fuse link is indicated by the solid line. The dotted line shows the clearing time or total time required for the fuse link to blow.

The first or second (fast) operating curve of the Kyle Recloser lies below the melting time curve of the fuse link, allows temporary faults to be cleared without damaging the fuse link.

To assure blowing of the fuse before the Kyle Recloser locks out, the clearing time curve of the fuse lies below the third or fourth (time delay) operating curve of the Recloser. Thus, the time for the fuse to blow is less than the operating time of the Recloser on these time delayed operations and proper coordination is assured.

Selective service operation as shown on this drawing is assured on all values of fault current up to 100 amperes.

Ask your Line Material representative for full information on Type "H" Kyle Automatic Oil Circuit Reclosers. He will be glad to supply time current charts and technical data on how Kyle Reclosers can be used to best advantage on your lines.

MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

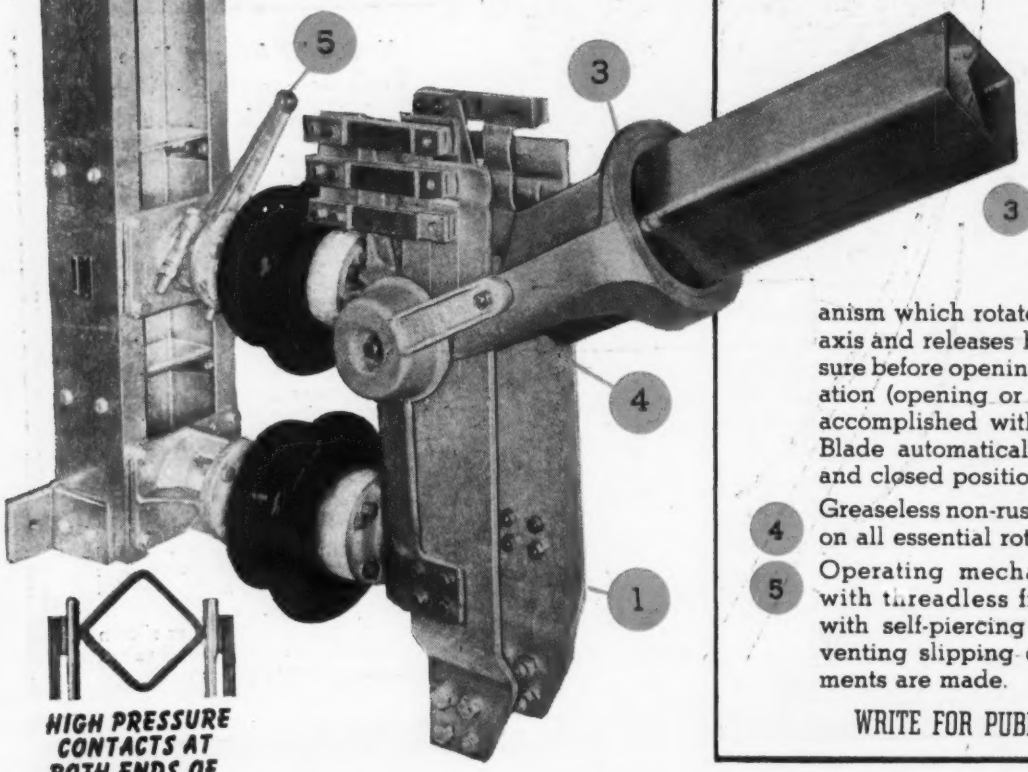
KYLE Circuit Breakers are Developed and Manufactured by LINE MATERIAL COMPANY

"MK-39" — THE MODERN DESIGN FOR HEAVY DUTY SERVICE

Single-Pole Unit of 23 Kv., 4000 Amp. 3-Pole Disconnecting Switch

"MK-39" group operated disconnecting switches for ampere ratings 2000 and over have built into them features you have a right to expect in modern switch design. Furthermore adequacy of both electrical and mechanical design has been fully proved by laboratory tests and service records.

Manufactured in 2000 to 6000 Amp Ratings —— 7.5 to 69 kv inclusive.



HIGH PRESSURE CONTACTS AT BOTH ENDS OF ROTATING BLADE

YOUR SYSTEM DESERVES THE BEST — YOU CAN HAVE IT AT NO GREATER COST

1. Liberal design with ample material for heat dissipation — no cast current carrying parts.
2. High pressure contacts at both ends of blade-eliminating flexible shunts and providing positive low resistance straight line current path from terminal to terminal.
3. Fully controlled blade movement actuated by enclosed ball bearing mechanism which rotates blade about its axis and releases high contact pressure before opening. Complete operation (opening or closing) is easily accomplished without shock or jar. Blade automatically locks in open and closed position.
4. Greaseless non-rusting ball bearings on all essential rotating parts.
5. Operating mechanism furnished with threadless fittings equipped with self-piercing set screws, preventing slipping once final adjustments are made.

WRITE FOR PUBLICATION 4209

INVEST IN VICTORY BONDS —— KEEP ALL YOU HAVE

DELTA-STAR ELECTRIC COMPANY

MAIN OFFICE AND FACTORY — 2400 Block, Fulton St., Chicago 12, Ill.
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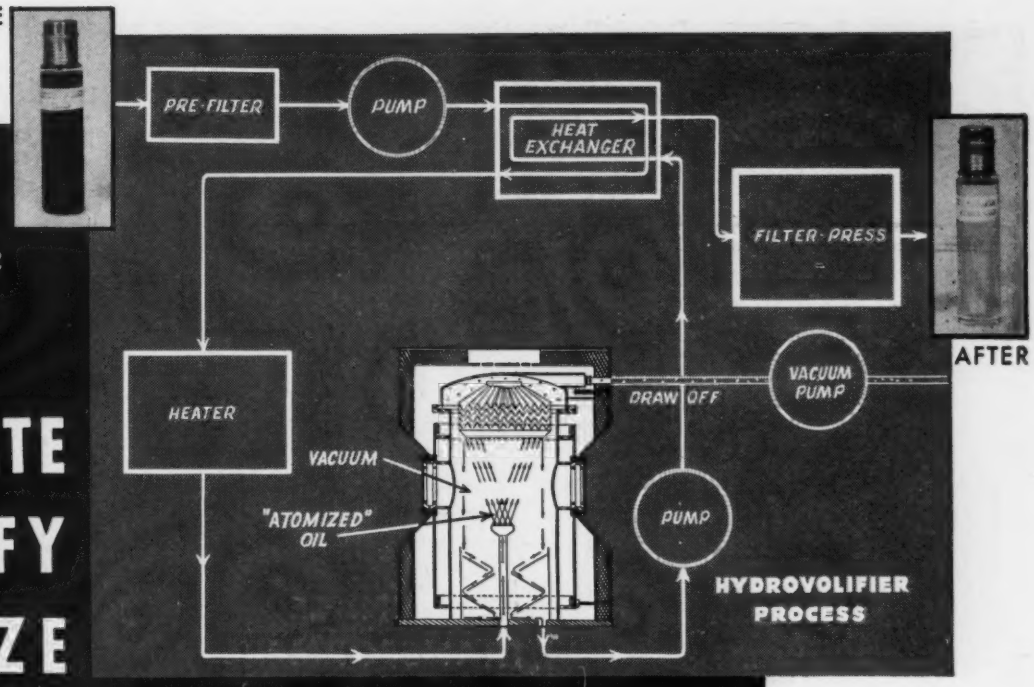
Canadian Line Materials Limited ..... Toronto 13, Canada



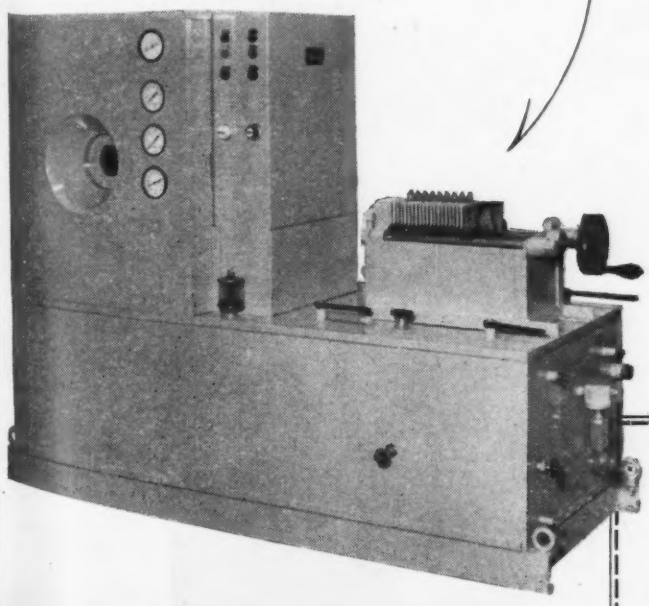
Here is how to completely

CLEAN
DEHYDRATE
DEGASIFY
STABILIZE
Electrical Insulating Oils

THE
HYDRO-VOLIFIER

Available in 3 standard sizes

100 GALLONS PER HOUR
300 GALLONS PER HOUR
500 GALLONS PER HOUR



The thorough maintenance of oil depends upon:

TWO SIMPLE STEPS

1 **"Atomizing" the oil into minute particles to make easy the separation of water, gases and volatile acids.**

2 **Performing Step 1 in a vacuum not only to separate the deteriorating elements from the oil, but also to prevent the reentry of these "enemies" into the oil.**

These two simple steps are the main reasons why the *exclusive* Buckeye Process is *raising* transformer and circuit breaker oils to new high dielectric values, and *maintaining* the oil at correct insulating values for longer periods of time.

The entire story of how it is done is told in a new booklet that will be off the presses very soon. Reserve your copy . . . now . . . by filling in and returning the coupon below.

BUCKEYE
LABORATORIES CORPORATION
1965 East 66th Street • Cleveland 3, Ohio

Manufacturers of equipment for maintaining insulating, lubricating and vacuum oils.

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THE BUCKEYE LABORATORIES CORPORATION
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Gentlemen:

Please send me a copy of Bulletin 100.

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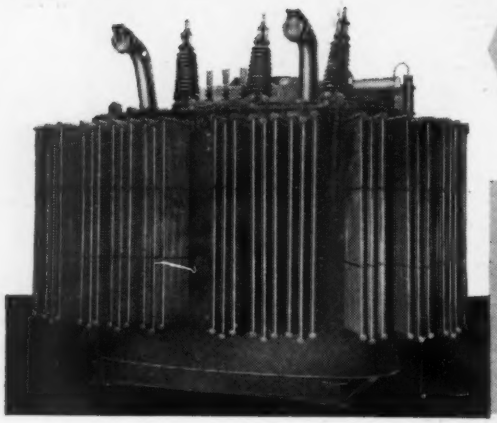
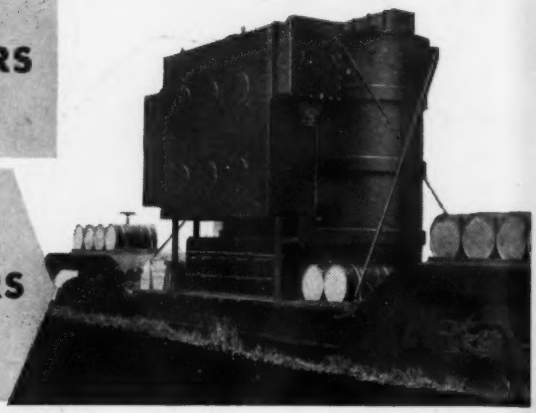
Pennsylvania POWER and DISTRIBUTION TRANSFORMERS



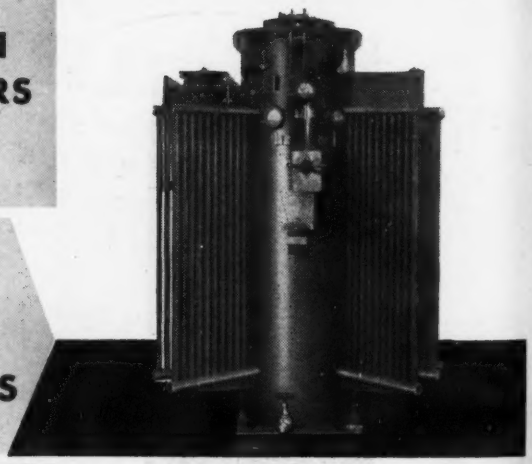
LARGE POWER TRANSFORMERS OISC

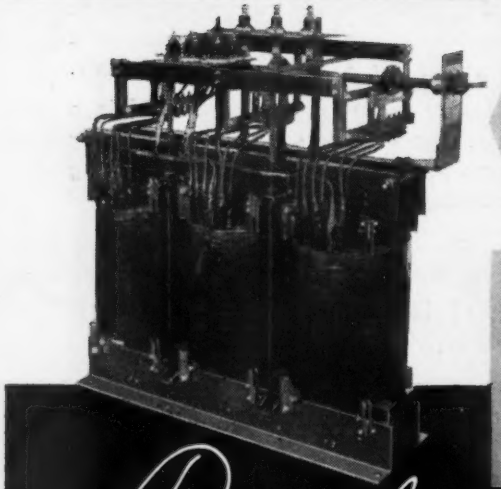
FURNACE TRANSFORMERS OIWC



DISTRIBUTION TRANSFORMERS OISC

ASKAREL FILLED TRANSFORMERS

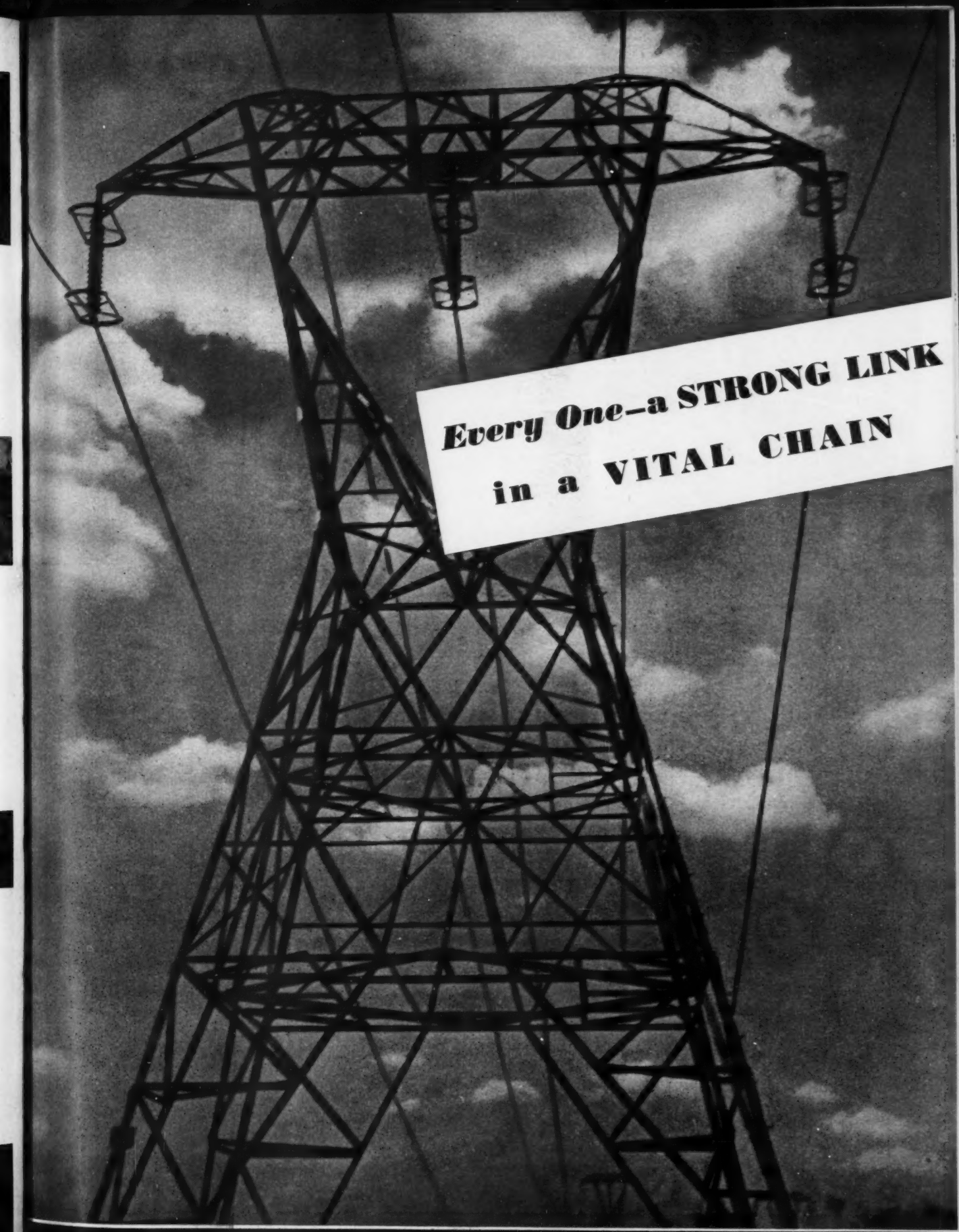




HIGH VOLTAGE DRY TYPE TRANSFORMERS
(2400 to 15,000 Volts)
500 Kva—3-phase
4160-480 Volt

LOW-VOLTAGE DRY TYPE TRANSFORMERS
Up to 600 Volts

Pennsylvania TRANSFORMER COMPANY
808 Ridge Avenue, N. S., Pittsburgh 12, Pa.



BLAW-KNOX TRANSMISSION TOWERS

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY • 2013 FARMERS BANK BLDG., PITTSBURGH, PA.

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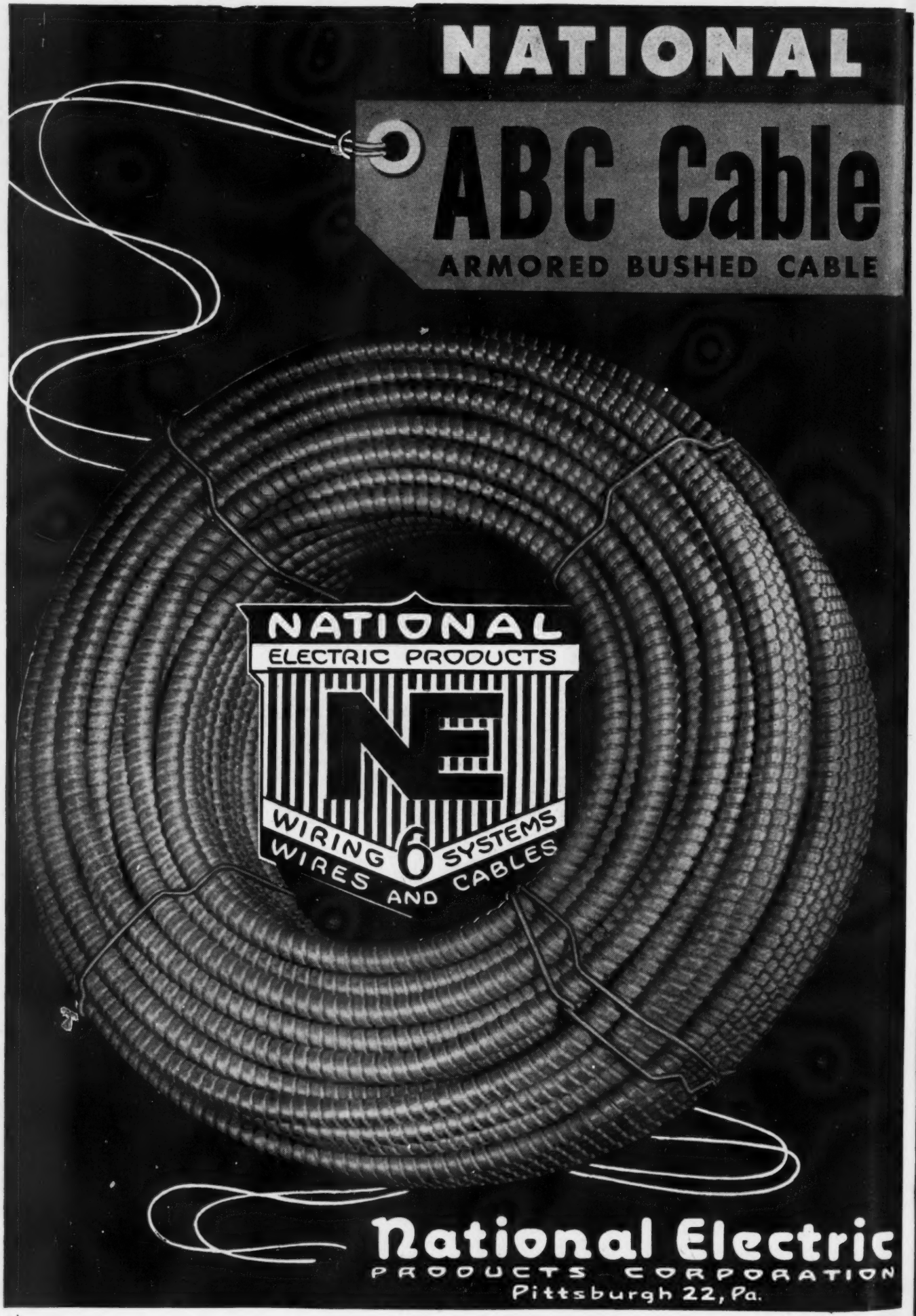
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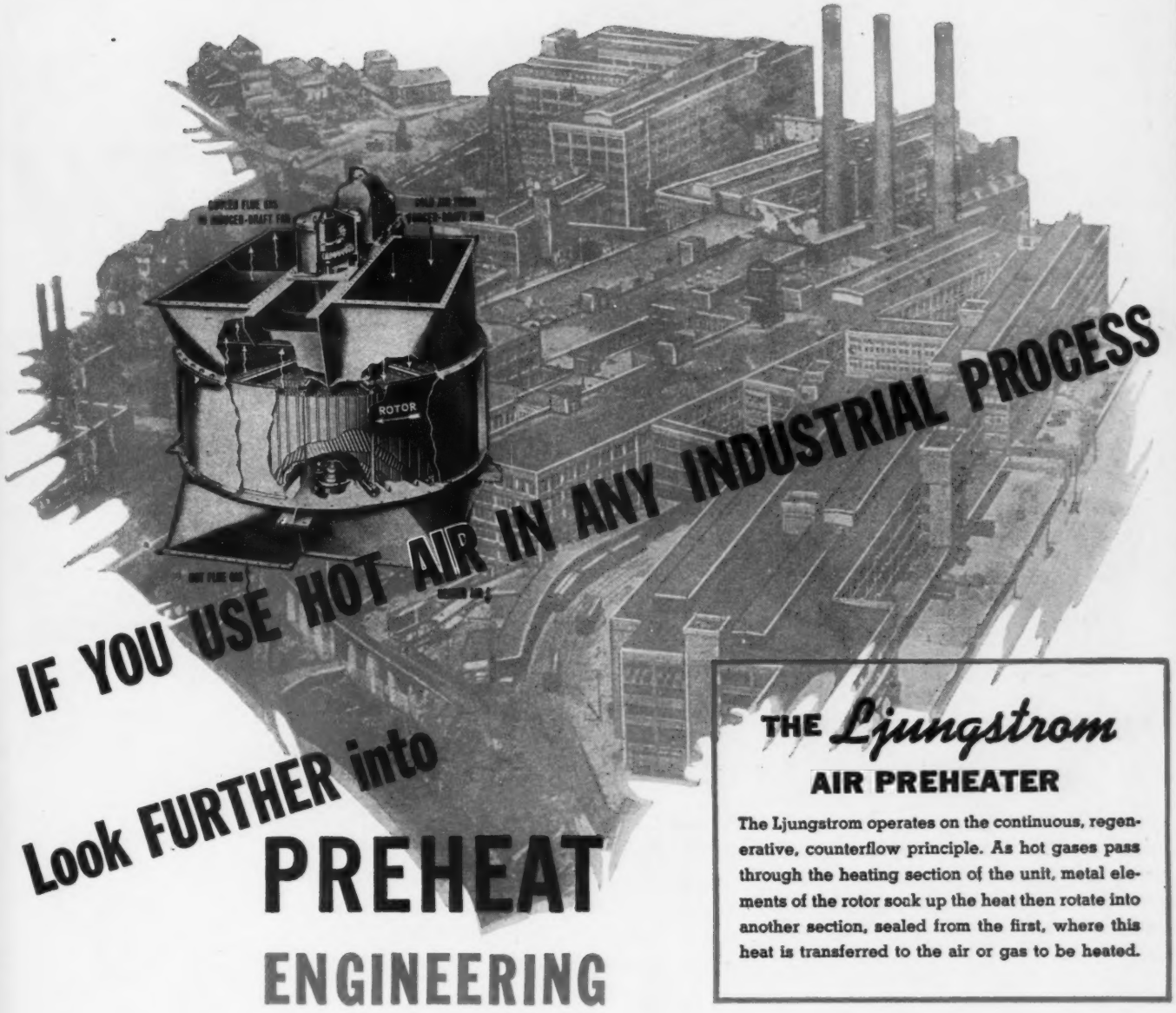
Pittsburgh 22, Pa.



IF YOU USE HOT AIR IN ANY INDUSTRIAL PROCESS

Look FURTHER into PREHEAT ENGINEERING

THE *Ljungstrom* AIR PREHEATER

The Ljungstrom operates on the continuous, regenerative, counterflow principle. As hot gases pass through the heating section of the unit, metal elements of the rotor soak up the heat then rotate into another section, sealed from the first, where this heat is transferred to the air or gas to be heated.

In addition to its contribution to higher heat recovery in steam generation, the Ljungstrom Air Preheater has other important industrial applications. If your process requires, or can use to advantage, preheated air or gas up to 1,400 deg. F., it will pay you to investigate the possibilities of the Ljungstrom.

Today, preheat engineering is improving copper smelting, aiding operation of waste disposal plants, lowering the cost of production of synthetic rubber. Chemical and metallurgical industries are exploring its potentialities as applied to all their processes employing heated air or other heated gases. Dehydrating plants, too, are looking further into its possibilities.

ENGINEERING SERVICE

The engineering staff of The Air Preheater Corporation is prepared to assist you in applying standard or special types of Ljungstrom preheaters to combustion improvement or to other, newer, uses. So that you may benefit from designing the Ljungstrom into your plant or process, call in the preheat engineer while plans are still in the formative stage.

THE

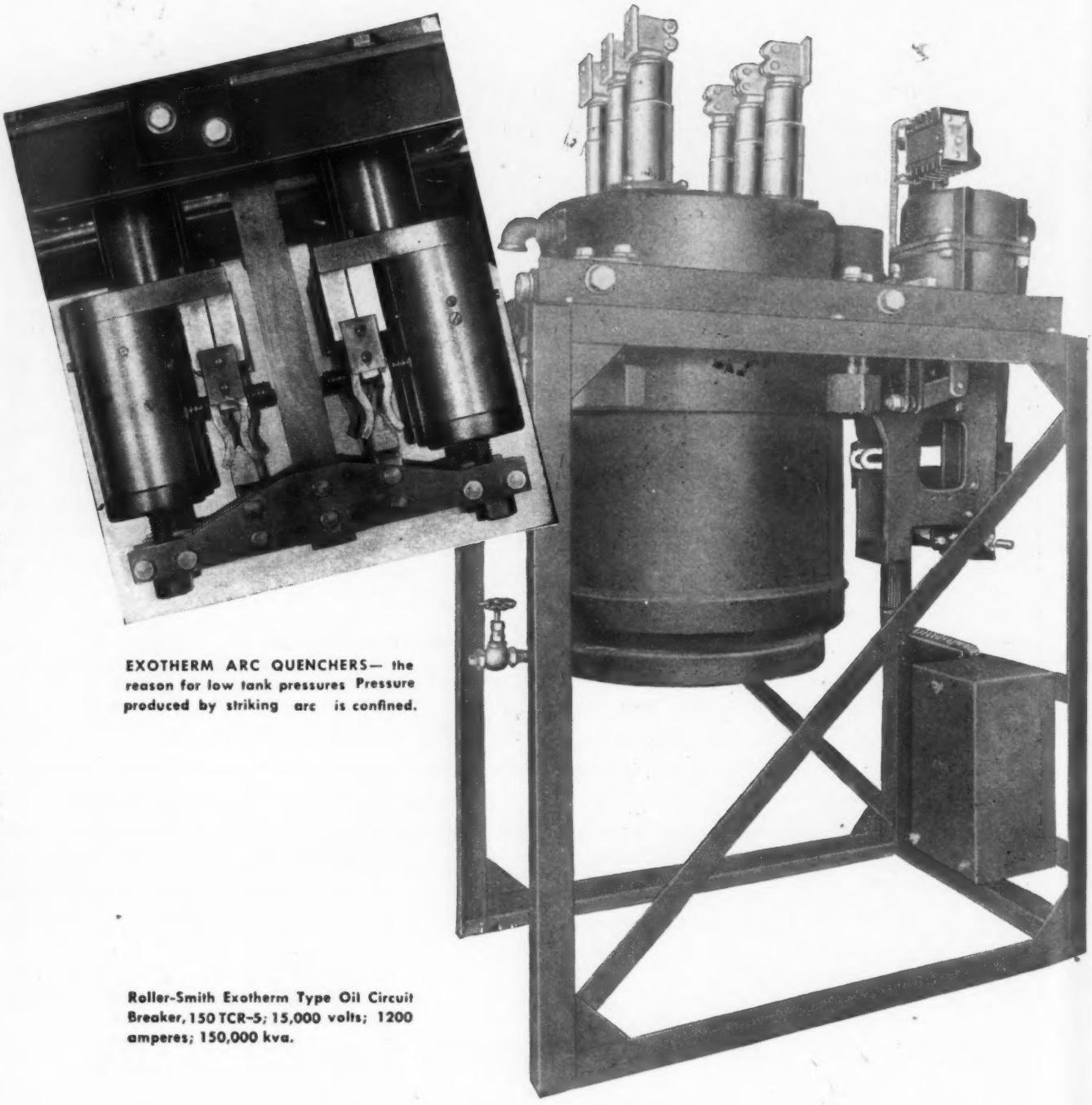
AIR PREHEATER

CORPORATION

Executive Offices: 60 East 42nd Street, New York 17, N. Y. • Plant: Wellsville, N. Y.

NEW EXOTHERM

of arc extinction gives added safety



EXOTHERM ARC QUENCHERS— the reason for low tank pressures Pressure produced by striking arc is confined.

Roller-Smith Exotherm Type Oil Circuit Breaker, 150 TCR-5; 15,000 volts; 1200 amperes; 150,000 kva.

GAI

FOUNDED 1941

Page 12
Gilbert Associates, Inc.
READING, PA. NEW YORK, N. Y. WASHINGTON, D. C.
CURRENT UTILITY LABOR AGREEMENTS
Analysis and Comment
MARGINAL NOTES
SECTION NO. 2.
"Employer-Employee Relations"
(b) Union Shop
Case No. 32.
32.1 In consideration hereof, it is agreed that all present employees of the Company, except those heretofore mutually agreed upon as exempt from this requirement, covered by this agreement, shall affiliate with and maintain membership in the Brotherhood, as a condition of employment, failing wherein, after due and timely notice to the Company, they shall be discharged, without recourse against the Company. It is still further agreed that all persons newly employed in the future in the classifications covered by this agreement, after three months continuous service with the Company, shall affiliate with and maintain membership in the Brotherhood as a condition of further employment. Such employees shall be recognized as members of the Brotherhood in all respects except those that relate to seniority. Employees transferred into the classifications covered by this agreement must affiliate and maintain membership in the Brotherhood, after thirty days service therein. This rule shall not apply to persons employed on a seasonal basis, such seasonal employment not to exceed five months. In this connection, the Company will advise the Brotherhood when it employs any individual for such seasonal employment.
This clause provides for a modified Union shop. Note the exemption of particularly those mutually agreed upon as exempt from this requirement." In this case those exempted are a group of employees of long standing with the Company, who have reached the age of sixty.
Gilbert Associates, Inc.
READING, PA. NEW YORK, N. Y. WASHINGTON, D. C.
CURRENT UTILITY LABOR AGREEMENTS
Analysis and Comment
MARGINAL NOT
SECTION NO. 2.
"Employer-Employee Relations"
(i) Rights of Management
Case No. 35.
35.1 The management of the Company, the direction of the working forces, and the right to hire, discharge, lay-off, promote, demote, transfer, or reassign employees for just cause, and the right to determine the number and class of employees to be employed or to be assigned to any given job or class of work is reserved solely and exclusively to the Company, subject, however, to the right of any employee, adversely affected by the exercise of these prerogatives, to appeal therefrom through the grievance procedure.
These two clauses b ment's right to emplo sons it will employ.
Case No. 36.
36.1 It is recognized that the right to hire, transfer, promote, demote, lay-off and release employees for just cause, is vested in the Company, subject to the right of appeal vested in the Union. The Company because of its small and scattered operations, further reserves the right to determine the number and class of men to be employed and to be assigned to any given job. Nothing herein contained shall deny or obstruct the right of any employee to adjust grievances as provided by this agreement, nor shall the rights herein reserved by the Company justify any violation or disregard of law, or any violation or disregard of the terms of this agreement.
This point
Case No. 37.
37.1 The Company expressly reserves the right to hire, promote, demote, lay-off, re-assign or release its employees for just cause.
Case No. 38.
38.1 The right to hire, re-assign, promote, demote, lay-off and discharge employees for just and lawful cause, and the management, disposition and number of the working forces shall vest solely and exclusively in the Company, but each employee covered by this Agreement shall possess the right of appeal as provided by the terms of this Agreement.

Up to the minute ANSWERS TO UTILITY LABOR PROBLEMS

Our 250-page, loose-leaf Manual recently released to the utility industry contains more than 1000 clauses selected from over 50 Company-Union Agreements. Experts' opinions are included in the form of marginal note comments, as illustrated above.

In this Manual, Utility Executives, lacking the research staff necessary to collate and analyze current Labor Agreements, can find informative suggestions and comments on such vital topics as: Wage Negotiations, Union Security, Arbitrations, and Working Conditions.

The price of this Manual, together with periodical revision sheets, is only $48.00 per year. Upon your request we will send this Manual to you for 15 days free examination. If it is not returned to us within the 15-day period, we will then bill you for $48.00. As part of our service, we are also prepared to answer subscribers' questions concerning their labor relations problems.

Gilbert Associates, Inc.

INDUSTRIAL RELATIONS DEPARTMENT

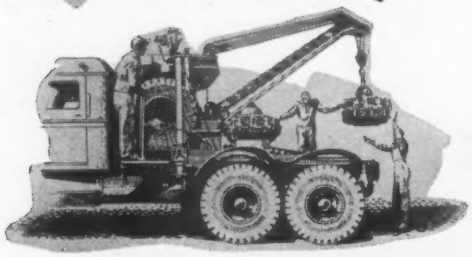
61 BROADWAY, N. Y. C.

NEW YORK, N. Y. READING, PA. WASHINGTON, D. C.

New GAR WOOD WINCHES

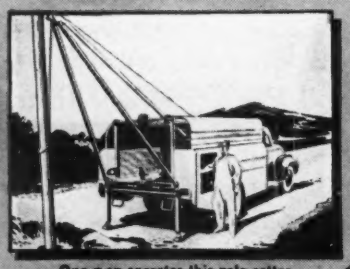
Radically Different!

Vastly Improved!

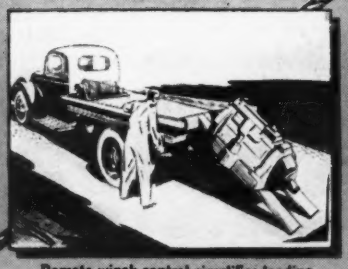


One of the Army's most stupendous jobs was the safe, speedy, efficient handling of its millions of tons of equipment and heavy materiel—A job requiring winches having operating features never before incorporated in such units. Gar Wood solved the problem to the entire satisfaction of the Army by designing and building thousands of these super winches—now they are available for all industrial purposes.

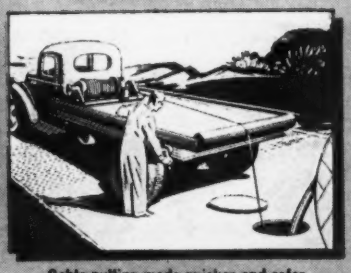
WHEREVER INDUSTRY NEEDS A LIFT



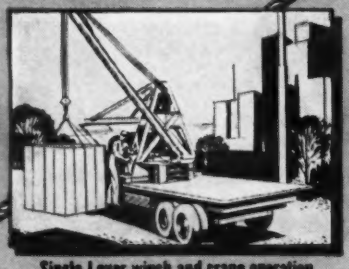
One man operates this pole setter.



Remote winch control simplifies loading.

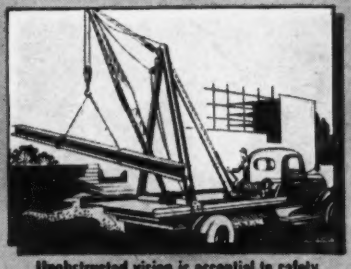


Cable pulling made quicker and safer.



Single Lever winch and crane operation.

A modern wrecker with remote control.



Unobstructed vision is essential to safety.

HOISTS AND BODIES • TANKS • CRANES • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

Time Now...to Have Your ELECTRICAL CONTRACTOR Make Your STATION LIGHTING CHECKUP

Look to BENJAMIN for co-operation in Service Station Lighting

Ads like this now appearing in SUPER SERVICE STATION and other publications are initial steps in Benjamin's Program of Cooperation with Contractors and Light and Power Companies in the field of Service Station Lighting and Floodlighting. Further details will be made available early in 1946.

1346

Make Sure Your Lighting Measures Up to the Stiffer Requirements of POST-WAR SELLING!

THIS IS A MESSAGE for you station operators who know that the day will soon be here when pre-war standards and methods won't be good enough for any department of service station operation!

One of the CHANGES that's certain to come is this: Improved service station lighting inside and out. For ompanies' plans and station surveys show that a om in station modernization is on the way! UST MEAN Better Lighting, too, because it's roven over and over again that no station is nized without Good *Lighting*.

Your local Electrical Contractor is ready to help you in TWO WAYS:

First: HELP YOU TO GET THE MAXIMUM BENEFIT OUT OF YOUR PRESENT LIGHTING SYSTEM

Second: HELP YOU PLAN AND GET BENJAMIN LIGHTING THAT WILL KEEP YOUR STATION OUT IN FRONT OF COMPETITION!!!

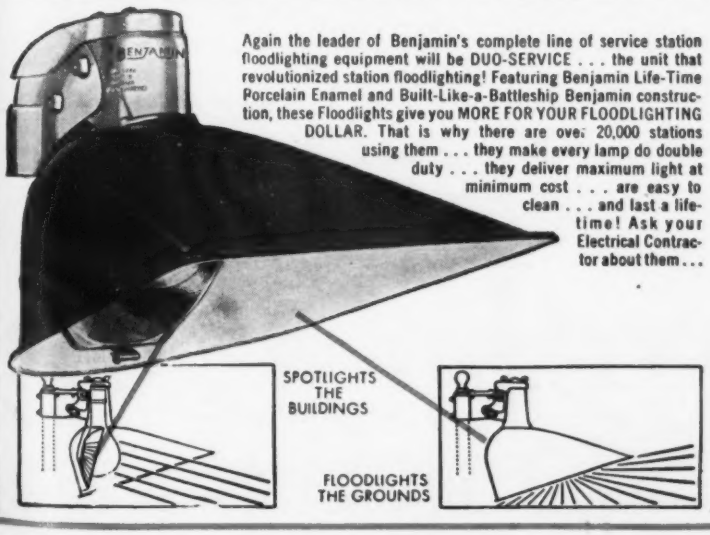
In your community there is one or more electrical contractors who, by experience and training, is well qualified to survey your station lighting requirements. Ask one of them to study your modernization plans, and submit a lighting recommendation. You can depend upon him to provide you with Lighting Equipment that is designed and built to give you maximum lighting efficiency at a minimum of operating and maintenance cost!

Calling in your electrical contractor is insurance against disappointment and assurance of satisfaction.

Benjamin Electric Mfg. Co., Dept. K. ***Des Plaines, Illinois***

THEY'RE BACK! The Original 2-in-1 and Most Popular of all Service Station Floodlighting Units...

BENJAMIN DUO-SERVICE FLOODLIGHTS



Again the leader of Benjamin's complete line of service station floodlighting equipment will be DUO-SERVICE . . . the unit that revolutionized station floodlighting! Featuring Benjamin Life-Time Porcelain Enamel and Built-Like-a-Battleship Benjamin construction, these Floodlights give you MORE FOR YOUR FLOODLIGHTING DOLLAR. That is why there are over 20,000 stations using them . . . they make every lamp do double duty . . . they deliver maximum light at minimum cost . . . are easy to clean . . . and last a lifetime! Ask your Electrical Contractor about them . . .

BENJAMIN

TRADE MARK

SERVICE STATION LIGHTING and *Floodlighting* EQUIPMENT

Distributed exclusively through electrical wholesalers

FOR YOUR SALES FORCE

Westinghouse Presents the most Comprehensive Lighting Course ever Prepared

—That's the name for a brand new, complete packaged lighting training course for all lighting sales personnel.

THESE ARE THE DAYS that find lighting companies rebuilding their war-depleted sales staffs to take advantage of the greatest opportunity to sell more and better lighting in the whole history of electrical power and light.

The problem facing every utility is: How can we train our salesmen quickly—efficiently—thoroughly, in the techniques of selling modern lighting in order to get our full share of the reconversion dollar in commercial, industrial, office and school lighting installations?

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

WHY?

DO HUBBARD STRAIGHT GROOVE GUY CLAMPS HOLD BEST?

1. **Because:** The **straight groove** eliminates the possibility of drawing a nut tight against an "arched" section which is out of contact with the strand.

Clamping area reduced by warped section. Causes slippage at low strains.

Hubbard Clamps have full clamping area. Hold to breaking strength of most strands.

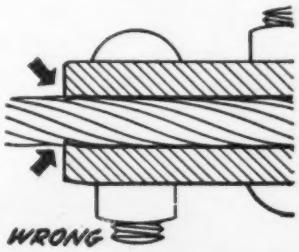
2. **Because:** The **straight groove** fits any and all twists, right or left hand and a variation in diameter without **creating** any high spots to **lessen clamping area.**

High spots in clamp reduce clamping area, cause slippage and injure strands.

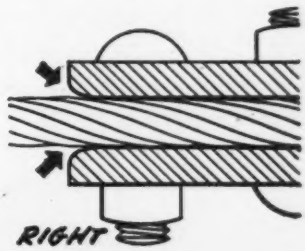
Hubbard Clamps fit snugly over any and all twists, right or left and variations of diameter.

3. **Because:** Bell-end grooves prevent injury to the strand.

4. **Because:** High carbon bolts prevent stripping or elongation. Heads are locked against turning while tightening—and the whole clamp is protected against corrosion by the best process commercially used — HUBBARD DOUBLE-DIP HOT GALVANIZING.



Sharp edge from sheared section injures and weakens the guy at end of clamp.



Rounded ends of Hubbard Clamp sections protect strand.

HUBBARD and COMPANY

Pittsburgh Oakland, Calif Chicago

HERE'S A PROBLEM
that may well be yours, now that new circuit construction is in order:

What's the best way to handle low density distribution loads where appearance or safety prohibits pole line construction?

Underground duct construction would be too costly for the load to be served. But performance-tested Roesheath is one proved answer. An economical one, too!

Lay down this dependable Roebling parkway cable into a shallow trench . . . 18 inches deep is usually enough. Designed for direct burial under severe conditions, Roesheath is the ideal cable for a wide variety of applications. Installation is quick, easy . . . service is uninterrupted and completely reliable.

Roesheath is flexible and easy to handle. It is built to Roebling high standards, of the finest materials . . . and *lead-mold cured* for exceptional durability. Tough and dense, the 60% neoprene sheath resists moisture, abrasion, deterioration.

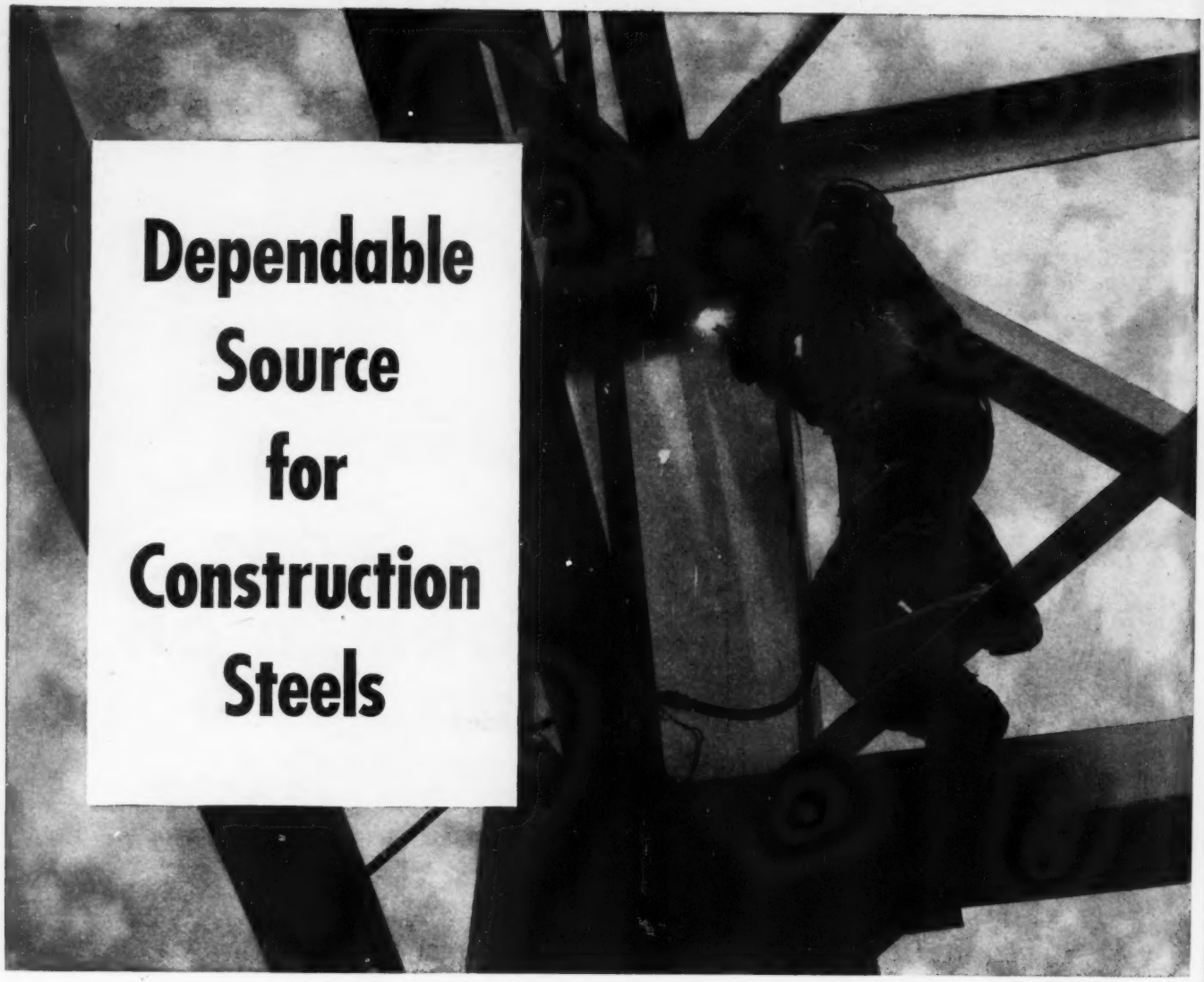
ROEB

ELECTRICAL WIRES

The Star PERFORMER ON YOUR LOAD BUILDING PROGRAM

YOU ARE LOOKING AT A STAR PERFORMER for building load . . . the Griswold 4012 Fry Kettle 12 KW connected load . . . with surface of area 12" x 18". It is one of a parade of Griswold stars in Deep Fat Frying. The Griswold line includes 7 sizes from 1.5 KW to 18 KW connected load. Restaurateurs know that Griswold Fry Kettles produce more food with less fat, size for size. All models feature splash backs . . . and foaming area which prevents fat overflow even when kettle is overloaded . . . and Griswold thermostat control insures full food values in cooking regardless of inexperienced help. Be sure to make Griswold Fry Kettles a leader on your load building program.

THE GRISWOLD MANUFACTURING CO. • ERIE, PA.



Dependable Source for Construction Steels

Time-saving, simplified steel buying is the result when you contact the nearest Ryerson plant. You get all your construction steels from a single source. Deliveries timed to the progress of the job, with every item tagged and identified for quick, easy placement.

Though shortages in some shapes and sizes continue, a wide variety of steel is available. Stocks include: structurals, plates, reinforcing bars and accessories, sheets, Inland 4-Way Floor Plate, steel spirals, electric welded wire fabric, threaded rods, removable metal forms for concrete joist construction, caisson rings, rivets, bolts, etc.

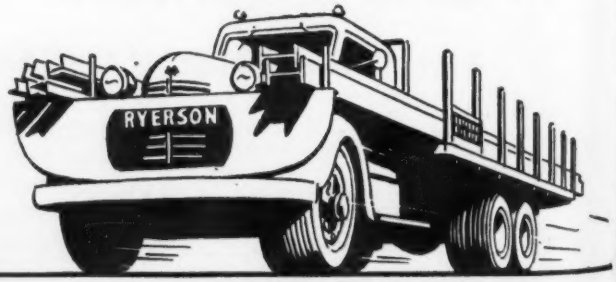
Here you deal with competent, practical engineers who are familiar with construction problems. They'll work with you every step of the way from estimating to planned deliveries. Submit your plans and specifications for prompt action.

HI-BOND* RE-BARS

Hi-Bond reinforcing bars provide the strongest grip between steel and concrete. Carried in stock for immediate shipment from Chicago, Milwaukee, Detroit and Cincinnati—cut, formed or bent to specifications.

*Reg. U. S. Pat. Off.

Joseph T. Ryerson & Son, Inc., Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston.



RYERSON STEEL

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
(Not available for equipment advertising)
15 cents a word, minimum charge $3.00.
(See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.
PROPOSALS, 75 cents a line an insertion.

INFORMATION:
BOX NUMBERS care publication New York, Chicago or San Francisco offices count as 10 words additional in undisplayed ads.
DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:
The advertising rate is $7.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. E. W.

NEW ADVERTISEMENTS received by 10 A. M., December 27 will appear in the January 5th issue subject to limitations of space available.

Unusual Opportunity

Southern Utility of 30,000 meters needs capable Distribution Engineer—not over 35 years—capacity to handle distribution betterment, ability to organize and supervise Distribution Department essential.

P-148, Electrical World
330 West 42nd St., New York 18, N. Y.

WANTED
Graduate MECHANICAL ENGINEER
For product development work in domestic laundry equipment and electrical appliance field. Must have broad mechanical background or preferably experience in engineering development of washers, ironers, dryers, ranges, etc. Address
P-133, Electrical World
330 West 42nd St., New York 18, N. Y.

WANTED
ELECTRICAL DESIGNERS
Experienced in
DESIGN of POWER & INDUSTRIAL PLANTS
Location N. Y. City
EBASCO SERVICES INC.
2 Rector St. N. Y. C. 6

POSITIONS VACANT

(Additional Position Vacant ad on page 148)

DESIGN DRAFTSMEN and detailers to work on steam turbines. Previous experience desirable but not necessary. Worthington Pump and Machinery Corp. Moore Steam Turbine Division, Wellsville, New York.

WANTED A man under 40 to take the position of Assistant Superintendent of Production in an electric utility company having a generating capacity of about 50,000 k.w. Should have mechanical engineering training and experience in steam power plant operation and maintenance and in the handling of men. There is a splendid opportunity for advancement as the situation is growing rapidly. P-144, Electrical World, 330 W. 42nd St., New York 18, N. Y.

EMPLOYMENT SERVICE

SALARIED POSITIONS $2,500-$25,000. Reconversion is creating lifetime opportunities now. This thoroughly organized confidential service of 35 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated, through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. Bixby, Inc., 262 Delward Bldg., Buffalo 2, N. Y.

POSITIONS WANTED

ELECTRICAL ENGINEER G.E. test. 11 years public utility design, construction, maintenance, underground distribution system and substations. At present associate engineer purchasing varied equipment for diesel plants, hydro plants, overhead and underground transmission systems, substations, supervisory control, etc. Age 39, married. PW-127, Electrical World, 330 W. 42nd St., New York 18, N. Y.

ELECTRICAL ENGINEER: M.S.E. University of Michigan, speaks fluently Russian and French, five and a half years experience in electrical field. Headed electrical section in concern designing industrial plants. Now employed with large manufacturer engaged in electronic work. Desire responsible position in the electrical field with engineering, consulting or research organization. PW-141, Electrical World, 330 W. 42nd St., New York 18, N. Y.

STATISTICIAN ECONOMIST: 17 years experience with two outstanding utilities in the field of regulatory reports, rate studies, financial operational and industrial relations reports and studies. PW-142, Electrical World, 330 W. 42nd St., New York 18, N. Y.

(Continued on page 148)

NEW INSULATED MAGNET WIRE

Item No.	Size	Description	Approx. Weight
22585	.072″ (#13 Awg.)	Triple Cotton Covered, Round	235#
22586	.072″ (#13 Awg.)	Asbestos Insulated, Reels	134#
22587	.081″ (#12 Awg.)	Single Glass Covered, Round	2,000#
22588	.081″ (#12 Awg.)	Single Glass Covered, Round	685#
22591	.049″ x .437″	Double Cotton Covered, Rect.	645#
22592	.051″ x .114″	Double Glass Covered, Rect.	1,530#
22593	.051″ x .325″	Double Cotton Covered, Rect.	499#
22595	.057″ x .365″	Double Glass Covered, Rect.	493#
22598	.064″ x .325″	Asbestos Insulated, Rect.	130#
22599	.064″ x .365″	Asbestos Insulated, Rect.	958#
22604	.102″ x .289″	Asbestos Covered, Rect.	604#
22605	.102″ x .325″	Double Glass Covered, Rect.	10,199#
22606	.106″ x .256″	Double Glass Covered, Rect.	180#
22607	.114″ x .258″	Double Glass Covered, Rect.	485#
22615	.182″ x .289″	Double Cotton Covered, Rect.	672#
618	.100″ x .400″	Double Glass Covered, Rect.	1,074#
619	.035″ x .155″	Double Vitreous	1,681#
620	.070″ x .250″	Double Vitreous	4,726#
621	.110″ x .185″	Double Vitreous	3,160#
622	21 Awg.	Single Vitreous	2,700#
624	17 Awg.	Double Cotton Covered, Enameled	7,000#
625	34 Awg.	Triple Formvar	1,469#
26285	.0008″ Dia. (#52 Awg.)	Enameled	1,015#
26286	.0005″ (#36 Awg.)	Enameled Dbl. Scrape Hardness	150#
26287	.1113″ (#29 Awg.)	Single Glass Covered	338#
26290	.0201″ (#24 Awg.)	Enameled Syn.	1,466#
26292	.036″ (#19 Awg.)	Single Cotton Covered Enameled	755#
26293	.0403″ (#18 Awg.)	Asbestos Insulated	209#
26294	.057″ (#15 Awg.)	Enameled with one rap of Manila Rope Paper	17,376#
26295	.072″ (#13 Awg.)	Enameled	448#
26296	.025″ x .410″	Double Glass Covered	1,500#
26297	.32″ x .365″	Double Glass Covered	8,045#
26298	.040″ x .365″	Double Glass Covered	4,184#
26299	.063″ x .625″	Double Cotton Covered	265#
26300	.081″ x .289″	Double Glass Covered	2,184#
26301	.091″ x .124″	Double Cotton Covered	231#
26302	.091″ x .289″	Double Glass Covered	2,000#
26303	.102″ x .129″	Double Cotton Covered	513#
26304	.102″ x .258″	Double Glass Covered	2,189#
26305	.114″ x .289″	Double Glass Covered	1,515#
26306	.129″ x .258″	Double Glass Covered	1,687#
26307	.129″ x .289″	Double Glass Covered	1,757#

DULIEN STEEL PRODUCTS, INC.
2280 WOOLWORTH BLDG. N. Y. 7, N. Y.
Tel. Cort. 7-4676

SUCCESSFUL OPERATION GUARANTEED

Every Machine in This Ad Is Owned Outright By Us

D. C. MOTORS

	HP	Make	Type	Volts	Speed
2—	1250	G.E.	MPC	550	130
1—	800	G.E.	MPC	660	600
2—	625	G.E.	MPC	500	130
1—	600	G.E.	MPC	600	650/900
1—	500	G.E.	MPC	230	900
1—	350	G.E.	MPC	220	450
1—	300	G.E.	MPC	230	275/550
1—	250	Al. Ch.		230	525
1—	200	Whse.		230	400
1—	200	Whse.	SK-191	230	850
2—	135/175	G.E.	MCF	230	450/1050
1—	150	G.E.	MPC	230	250/450
2—	130	Cr. Wh.	CMC-65H	550	1200
2—	125	G.E.	CO	230	625
1—	100	G.E.	LC-50	230	1206
1—	100	G.E.	MPC	230	225/450

TURBO GENERATOR SETS

1—1500 KW GE 240 V. D.C. geared to Curtis mixed pressure condensing turbine 120 and 16 lbs. complete with surface condenser and accessories.

2—1000 KW GE 240 V. D.C. geared to Curtis mixed pressure condensing turbine 135 and 16 lbs. complete with surface condensers and accessories.

1—500 KW Whse. 625 KVA, 440 V., 3 ph. 60 cy. 3600 RPM with Parsons' 145/175 lb. condensing turbine complete with jet condenser and accessories.

1—75 KW Ridgeway 250 V. D.C. with Terry 180 lb. pressure with 12 lbs. back pressure, 2000 RPM.

TRANSFORMERS

	KVA	Make	PH	Type	Voltage
3—	1667	Pitts	1	OISC	13200x2350
1—	1050	G.E.	3	WCTH	11000x445
3—	525	G.E.	1	HJDD	2300x445
4—	500	Pitts	1	OISC	13200x2300
1—	450	G.E.	3	HTDD	6600x240
2—	363	Whse.	1	OISC	2300x460
2—	333	Pitts.	1	OISC	2400x220
1—	300	Pitts.	3	ODSC	4150x208/120
3—	200	G.E.	1	H-IDD	26400x115/460
7—	125	Maloney	1	C	2300x220/440

MOTOR GENERATOR SETS

3 ph. 60 cycle

1—1500 KW GE 275 V. Gen. d.c. to 2100 HP 2300 V.
1—1000 KW GE 250 B, d.c. to 1200 Kva. 440/2200 V.
1— 500 KW GE 600 V. DC Gen. d.c. to 700 HP—2200/13200 V. Syn. Motor with Exciter.
1—350 KW GE 220 V. AC Gen. d.c. to 500 HP 250 V. DC motor.
1— 300 KW Whse. 275 V. d.c. to 450 HP. 6600/4000 V.
1— 240 KW Whse. 125 V. Gen. d.c. to 350 HP 440 V.
1— 216 KW 288 Kva. Whse. 450 v. AC Gen. d.c. to 304 HP—115 v. D.C. Motor.
1— 200 KW GE 575 V. d.c. to 300 HP. 2300 V. Ind.
2— 150 KW Whse. 600 V. d.c. to 225 HP. 2300 V.
1— 150 KW Whse. 250 V. d.c. to 200 HP. 2300 V. Ind.
1— 150 KW Whse. 3 unit (2) 75 KW 125 V. gens. d.c. to 200 HP. 2300 V. Ind.
1— 75 KW GE 125 V. Gen. to 120 HP IK 400/2300.
1— 50 KW GE 125 V. Gen. to 75 HP KT 4000/2300 V.
1— 45 KW Whse. 250 V. d.c. to 70 HP. 440 V. Ind.

ROTARY CONVERTERS

60 Cycle

	KW	Make	Speed	D.C. Volt	Trans Volts
1—	1500	Whse.	720	600	2300
1—	1500	Whse.	600	600	11500
1—	1250	G.E.	720	250	2300
1—	1000	G.E.	900	600	13200
1—	1000	Whse.	900	600	11000
1—	750	G.E.	1200	600	2300
1—	750	Whse.	720	250	6600/2300
1—	500	Al. Ch.	1200	250	13200
1—	500	Whse.	1200	600	13200/2300
1—	300	Al. Ch.	1200	250	2300
2—	300	G.E.	1200	600	2300
1—	300	Al. Ch.	1200	250	2400

25 cycle

2—	1500	G.E.	500	225/275	13200/6600
1—	500	G.E.	750	225/275	13200/6600

All units can be furnished with AC and DC Control

A. C. MOTORS

3 ph. 60 cycle

Synchronous

	HP	Make	Type	Volts	Speed
2—	2100	G.E.	ATI	2300/4600	514
1—	600	Al. Ch.		2200	720
1—	187	G.E.	ATI	2300	720
1—	125	G.E.	ATI	2300	900
1—	75	G.E.	TS-7556	220/440	600

Slip Ring

1—	2500	G.E.	MT	6600	253
1—	1200	Cr.-Wh.	801-Q	220	237
1—	800	Al. Ch.		440	885
1—	600	Cr. Wh.	131-AQ	2300	507
1—	500	Al. Ch.	ANY-36	2300	590
1—	450	Whse.	CW	2200	875
1—	400	Al. Ch.		2300	505
1—	400	G.E.	IP	2200	252
1—	350	G.E.	MT-442y	4000/2300	257
1—	250	G.E.	MT-424y	4000	257
1—	200	G.E.	IM-3Brg.	440	450
1—	200	G.E.	IE-1315	550/2200	1750
1—	150	Whse.	CI-954A	440	435
1—	100	G.E.	IM	220	1750
1—	100	G.E.	IM	440	575

Squirrel Cage

1—	300	Whse.	CS	550	580
1—	300	G.E.	IK-17	440	900
1—	200	G.E.	IK	550	580
2—	200	G.E.	IK	2300	1175
1—	175/112	G.E.	IK	440	900/720
1—	150	Whse.	CS	550	400

SYNCHRONOUS CONDENSERS

1—	5000	Whse.		2300/4	900
1—	3000	Al. Ch.		2300	900
1—	2000	G.E.	ATI	600	900
1—	750	G.E.	ATI	220/440	900

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(Continued from page 147)

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1—150 KW, 125 volt Westinghouse Squirrel Cage.
1—75 KW, 125 volt, General Electric, squirrel cage.
1—15 KW, 250 volt, General Electric, squirrel cage.

MOTORS—3 PHASE 60 CYCLE

1—500 H.P., 900 RPM, 440 volt, Lincoln slip ring.
1—400 H.P., 220 volt, 1200 RPM, Westinghouse squirrel cage.
1—350 H.P., 300 RPM, 400 volt, General Electric slip ring.
1—250 H.P., 600 RPM, 2200 volt, General Electric slip ring.
1—200 H.P., 1800 RPM, 220 volt, General Electric slip ring.
1—200 H.P., 600 RPM, 550 volt, Westinghouse slip ring.
1—200 H.P., 600 RPM, 440 volt, Crocker-Wheeler slip ring.
1—150 H.P., 1800 RPM, 440 volt, General Electric squirrel cage.
2—150 H.P., 1800 RPM, 220 volt, Westinghouse slip ring.
1—150 H.P., 400 RPM, 440 volt, General Electric squirrel cage.
3—100 H.P., 720 RPM, 440 volt, General Electric slip ring.
1—100 H.P., 600 RPM, 2200 volt, General Electric slip ring.
1—100 H.P., 450 RPM, 440 volt, General Electric squirrel cage.
1—100 H.P., 1800 RPM., 440 volt G.E., squirrel cage.
1—90 H.P., 400 RPM, 650 volt, Crocker-Wheeler squirrel cage.

Gasoline Driven Generator Sets

2—25 KW, 125 volt, direct current
130 KW, 125 volt, direct current

1—75 H.P., 720 RPM, 440 volt, Westinghouse slip ring.
1—50 H.P., 900 RPM, 440 volt, General Electric slip ring.

MOTORS—D.C. 230 VOLTS

2—450 HP, 400 RPM, G.E.
1—250 HP, 760 RPM, Electro-Dynamic.
2—125 HP, 950 RPM, G.E.
1—100 HP, G.E., 575 RPM.
1— 50 HP, 750 RPM, Westinghouse, type SK.
1— 50 HP, 700 RPM, Crocker-Wheeler.
1— 40 HP, 775 RPM, Westinghouse.

TRANSFORMERS

2—400 KVA, G.E., 4156-240/480 v., Scott taps.
3—300 KVA, Pittsburgh, 7800/440 volts.
3—150 KVA, G.E., 33,000 2300/4000 Y.
3—150 KVA, General Electric, 2200-220/440.
3—100 KVA, Westinghouse, 11,430/250 volts.
1—100 KVA, Pittsburgh, 1375/2750-110/220 volts.
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3— 75 KVA, G.E., 13500-7500/440 volts.
1— 75 KVA, G.E., 3 phase, 4156Y-120/208Y.
2— 50 KVA, Phgh., 7500/15,000 volts-110/220 volts
1— 25 KVA, G.E., 220/110-20/110 volts.

MOTORS—VARIABLE SPEED 230 VOLTS

1—90 HP, 470/940 RPM, General Electric.
1—75 HP, 525/1575 RPM, Electro Dynamic.
1—35 HP, 500/1500 RPM, Westinghouse.
1—30 HP, 225/900 RPM, Crocker-Wheeler.
1—30 HP, 400/1200 RPM, General Electric.
2—25 HP, 300/990 RPM, Electro Dynamic.
1—20 HP, 750/1500 RPM, General Electric.
1—15 HP, 300/1200 RPM, G.E.
1—13/18 HP, 350/1200 RPM, Electro Dynamic.
2—11½ HP, 500/1500 RPM, Westinghouse type, SK.
1—5 HP, 600/1200 RPM, General Electric.
1—5 HP, 450/1800 RPM, Crocker Wheeler.
1—5 HP, 400/1600 RPM, Diehl.
1—5 HP, 225/900 RPM, Electro Dynamic.

INSTRUMENTS

25—Westinghouse type U recording ammeters with split core CT.
25—Westinghouse type U recording voltmeters.

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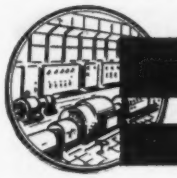
600 KW, Terry dual bleeder condensing Turbine only.
1—300 KW, G.E., 3 ph., 60 cy., 220 volt, cond.
1—300 KW, G.E., 3 ph., 60 cy., 220 volt, cond.
1— 50 KW., 125 volt Westinghouse, non condensing.
1— 30 KW., 125 volt Allis-Chalmers, noncondensing.

GASOLINE DRIVEN GENERATOR SETS

1—120 K.W. 220 volt, 3 phase.
1— 30 K.W. 125 volt, direct current.
2— 25 K.W. 125 volt, direct current.



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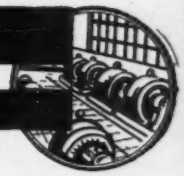

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